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APPENDIX A

BORING AND MONITORING WELL CONSTRUCTION LOGS

gai CONSULTANTS, INC.

PROJECT VEPCO/Possum Point — PROJECT NO. 87-215-30

ELEVATION ~85' BKUNTON — GWL 0 HRS — BORING NO. ED-26

DATE 6-1-87 / 5-29-87 — FIELD ENGINEER WH ROBINSON — PAGE NO. 1 OF 3

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
0.0	1 4 4	OS-1			V. STIFF	BRN	SANDY SILT W/ TRACE CLAY, TRACE GRAVEL	ML	*2.0 MOIST, FEW FINE ROOTS.
5.0	4 7 9	OS-2				BRN & GRY	SILT W/ TRACE CLAY, TRACE SAND		*3.7 SL. MOIST TO MOIST,
							-TRACE TO SOME CLAY		MOTTLED GRY & BRN, BLOCKY STRUCTURE,
10.0	4 6 9	OS-3		10.0	MED. DENSE	LT. BRN & RD-BRN	SILTY FN. TO MED. SAND, TRACE CLAY	SM	*1.8 MOIST, FE-STAIN MOTTLES.
							-LT. GRN-GRY CLAYEY SILT AND SAND SEAM 11.0-11.5'		
15.0	5 12 14	OS-4							MOIST.
20.0	9 40 23	OS-5			SOFT	LT. GRN-GRY & RD-BRN	-SOME GRAVEL / CLAYEY SILT W/ TRACE TO SOME SAND, SOME GRAVEL	ML	*0.3 V. MOIST, FE-STAIN MOTTLES, ROCK FRAGMENTS, FEW THIN SANDY LAYERS.
25.0	9 13 16	OS-6			V. STIFF TO HARD	MED TO DK GRN-GRY	SILT W/ TRACE TO SOME CLAY, TRACE V. FN. SAND		*3.2 SL. MOIST. BLOCKY STRUCTURE, VERY MICACEOUS, SOAPY FEELING.
30.0									

REMARKS** 4" I.D. HOLLOW-STEM AUGER 0.0-25.0'; 6" I.D. HOLLOW-STEM AUGER 25.0-81.0; SPT TO 82.5'. WELL SET THROUGH AUGERS. DRILLERS: J. LANG, G. DYE

R16: TRUCK-MOUNTED MOBILE B61

PROJECT NO. 87-215-30

BORING NO. ED-26

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

gai CONSULTANTS, INC.

PROJECT VEPCO/Possum Point — PROJECT NO. 87-215-30

ELEVATION _____ GWL 0 HRS _____ HRS — BORING NO. ED-26

DATE 6-2-87 6-1-87 — FIELD ENGINEER W H ROBINSON — PAGE NO. 2 OF 3

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	COLOR	MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
30.0	10 23 27	OS-7			V. STIFF TO HARD	DK. GRN-GRY TO GRY	SILT W/ TRACE TO SOME CLAY, TRACE V. FN. SAND	ML	*4.0 SL. MOIST, BLOCKY STRUCTURE, VERY MICACEOUS,
						DK. BLU-GRN-GRY TO GRY	— TRACE TO SOME MED. TO COARSE SAND, TR. FN. GRAVEL		FEW FE-STAINS.
35.0									
	20 45 51	OS-8		36.0	V. DENSE	GRN-GRY, LT. GRN-GRY & LT. BRN	IRREGULARLY INTERBEDDED CLAYEY SILT AND MED. TO COARSE SAND	ML TO SM	SL. MOIST TO MOIST. SOME FE-STAINS. SOME SLICKENSIDES
38.0									
	19 45 56	OS-9				LT. BRN	SILTY MED. TO COARSE SAND W/ TRACE TO SOME CLAY	SM	MOIST TO V. MOIST.
						LT. GRN-GRY			POSSIBLY STRATUM
45.0									
	29 54 59/4	OS-10							VERY MOIST
				49.0					
50.0					HARD	BLU-GRN-GRY	SILT W/ TRACE TO SOME CLAY	ML	END OF DAY 6-1-87.
	24 46 53/3	OS-11					TRACE V. FN. SAND		*5.0+ DRY TO SLIGHTLY MOIST.
							— TRACE TO SOME V. FN. SAND		A FEW THIN SANDY LAYERS. SOME FE-STAINS. MICACEOUS.
55.0									POSSIBLY STRATUM E
	22 39 30	OS-12					— SOME TO AND V. FN. SAND		*5.0+ DRY TO SLIGHTLY MOIST.
									FE-STAIN MOTTLES
					HARD TO V. DENSE	GRN-GRY	V. FN. SAND AND SILT W/ TRACE TO SOME CLAY	ML TO SM	SLIGHTLY MOIST TO MOIST.
60.0									

REMARKS** _____

PROJECT NO. 87-215-30

BORING NO. ED-26

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

PROJECT VEPCO/POSSUM POINT — PROJECT NO. 87-215-30

ELEVATION _____ GWL 0 HRS _____ HRS — BORING NO. ED-26

DATE 6-3-87 / 6-2-87 — FIELD ENGINEER W H ROBINSON — PAGE NO. 3 OF 3

DEPTH FEET	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%)	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY—CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
60.0	29/31/36	O S-13			VERY DENSE	GRN-GRY & BLU-GRN-GRY	VERY FN SAND AND SILT W/ TRACE TO SOME CLAY	ML TO SM	SL. MOIST TO MOIST, MICACEOUS, INTERMIXED SANDY AND
				63.0			SILTY FN TO MED. SAND W/ TRACE CLAY	SM	SILTY LAYERS.
65.0	12/28/36	O S-14		66.0					MOIST TO V. MOIST. MICACEOUS.
66.5	29/50/4	O S-15					FN. TO MED SAND, SOME TO AND SILT, TRACE CLAY	SM TO ML	BLOCKY STRUCTURE MOIST.
70.0	13/30/43	O S-16					VERY FN TO FN SAND AND SILT W/ TRACE TO SOME CLAY		MICACEOUS, SOME LAYERS MORE SAND THAN OTHERS. SL. MOIST TO MOIST, MICACEOUS.
				74.0					
75.0	14/31/43	O S-17					SILTY MED. SAND W/ TRACE CLAY	SM	MOIST TO V. MOIST. A FEW THIN SILTY LAYERS.
78.0	15/33/38	O S-18							END OF DAY 6-2-87 MOIST TO V. MOIST,
81.0	13/24/31	O S-19					IRREGULARLY INTERBEDDED SILTY MED. SAND, SILTY CLAY AND COALY CARBONACEOUS MATERIAL.	SM TO CL	MOIST
82.5							BOTTOM OF HOLE 82.5'		
							WELL INSTALLATION DETAILS:		
							SCREENED INTERVAL: 80.0 - 60.0'		
							COARSE SILICA SAND: 82.5 - 57.0'		
							BENTONITE PELLETS: 57.0 - 51.0'		
							CEMENT + 5% BENTONITE POWDER GROUT: 51.0 - 1.0'		
							CEMENT: 1.0 - 0.0'		

REMARKS** _____

PROJECT NO. 87-215-30

BORING NO. ED-26

*POCKET PENETROMETER READINGS

**METHOD OF ADVANCING AND CLEANING BORING

Soil Boring Log

Borehole Number: ED-24R

ED-24R

PROJECT INFORMATION		DRILLING INFORMATION	
ROJECT:	**Dominion - Possum Point Power Station**	DRILLING CO.:	**Parratt Wolff, Inc.**
ITE LOCATION:	**Dumfries, Virginia**	DRILLER:	**Kevin White, George Martincic**
)B NAME:	**Possum Point Well Installation**	RIG TYPE:	**Diedrich Drill Rig**
)GGED BY:	**Kevin Goerger**	METHOD OF DRILLING	**Hollow-stem Auger**
ROJECT MANAGER:	**Montgomery Bennett**	SAMPLING METHODS:	**Soil cuttings; 5 foot intervals**
ATES DRILLED:	**9/12/2006**	HAMMER:	**None**
OREHOLE NO.:	**ED-24R**	TOTAL DEPTH:	**63**

OTES: Overcast & 65 degrees F

▼ Water level in completed well NM = Not measured

EPTH	SOIL/ROCK SYMBOLS	SOIL DESCRIPTION	PID	WELL CONSTRUCTION	NOTES
0		TOPSOIL	0.0		GES hand cleared to 4 feet below ground surface
-5		Red and brown fine grained SAND with some SILT, loose, dry	0.0		Well construction: 10 feet of 2" 10-slot schedule 40 PVC and 53' of 2" schedule 40 riser. 3' stick-up protective riser with 2' diameter circular concrete well pad.
10		Red and brown fine grained SAND with some SILT, loose, dry	0.0		
15		Brown fine grained SAND with some SILT, loose, dry	0.0		
20		Brown fine grained SAND with some SILT, loose, dry to 23', wet after 23'	0.0		
25 ▼		Brown fine grained SAND and SILT, sticky, moist	0.0		
30		Brown medium grained SAND and SILT, sticky, moist	0.0		
35		Brown medium to fine grained SAND, loose, wet	0.0		
40		Brown medium to fine grained SAND, loose, wet	0.0		
45		Brown medium to fine grained SAND, loose, wet	0.0		
50		Brown medium to fine grained SAND, loose, wet	0.0		
55		Brown medium to fine grained SAND, loose, wet	0.0		
60		Brown medium to fine grained SAND, loose, wet	0.0		
		Brown CLAY, firm, wet			

Project: Dominion - Possum Point Power Station-SCR
Project Location: Dumfries, Virginia
Project Number: 21354933

Log of Borehole ED-23R

Sheet 1 of 3

Date(s) Drilled	**3/8/04-3/9/04**	Logged By	**B. Fisher**	Reviewed By	**T. Kelly**
Drilling Method	**Hollow Stem Auger**	Drilling Contractor	**Fishburne Drilling, Inc.**	Total Depth of Borehole	**62.0 feet**
Drill Rig Type	**All Terrain Truck Mounted**	Drill Bit Size/Type	**4-1/4 inch**	Ground Surface Elevation	
Groundwater Level(s)	**During drilling 24.0; Static 23.28**	Sampling Method	**24 - inch Split Spoon Sampler**	Hammer Data	**140 lbs./30-inches**
Borehole Backfill	**Cement/Bentonite grout**	Comments	**Monitoring Wells installed on corner property opposite Ash pond E**		

Elevation, feet	Downhole Depth, feet	SAMPLES Type	Number	Recovery (feet)	PID	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
	0				NR		SM	10YR 2/1 black mottled with 10YR 6/4 light yellowish brown, silty fine Sand, moist, roots, organic matter	
			1	1.0	NR			10YR 4/6 dark yellowish brown, silty fine Sand, moist, elastic, soft Not Recovered	
	2							Not Sampled	
					NR		SM	10YR 5/8 yellowish brown, silty fine Sand with trace medium sand, slightly moist, moderately elastic, soft	
	4		2	1.5	NR		SM	5Y 6/2 light olive gray mottled with 5YR 5/8 yellowish red, medium sandy Clay, slightly moist, moderately stiff, low plasticity Not Recovered	
								Not Sampled	
	6								
	8				NR		SC	10YR 5/4 yellowish brown, clayey very fine Sand with some silt and trace medium sand, moist, loose to medium dense, low plasticity	
			3	1.0	2 ppm		SC	5Y 7/2 light gray, clayey very fine Sand with some medium sand, moist, loose to medium dense; medium sand 5YR 5/8 yellowish red	
	10							Not Sampled	
	12								
					NR		SC	10YR 5/8 yellowish brown mottled with some 10YR 2/1 black, clayey very fine Sand with trace medium sand, moist, loose, moderately plastic	
	14		4	2.0	NR		SC	7.5YR 5/8 strong brown mottled with 5Y 7/2 light gray, very fine to medium Sand with trace clay, moist, loose	
	16							Not Sampled	
	18				NR		SC	10YR 5/8 yellowish brown mottled with 5YR 5/8 yellowish red, clayey very fine to fine Sand with some medium sand, moist, low plasticity, very loose to loose	
			5	1.0	NR			Not Recovered	
	20								

Report: ENV_12AS_CLEVELAND+/-USCS; File: POSSUM POINT-SCR.GPJ; 7/30/2004 ED-23R

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Project: Dominion - Possum Point Power Station-SCR
Project Location: Dumfries, Virginia
Project Number: 21354933

Log of Borehole ED-23R

Elevation, feet / Downhole Depth, feet	SAMPLES Type	SAMPLES Number	SAMPLES Recovery (feet)	SAMPLES PID	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
20							Not Sampled	
22								
				NR				
24		6	1.5	NR		SC	5Y 6/2 light olive gray, fine to medium Sand with some clay, wet, soft	
							Not Recovered	
26							Not Sampled	
28		7	1.5			SC	5Y 6/2 light olive gray mottled with 7.5YR 5/8 strong brown, very fine to fine Sand with trace clay, wet, soft	
30							Not Recovered	
							Not Sampled	
32								
34		8	2.0			SP	2.5Y 5/3 light olive brown, fine to coarse Sand, wet, poorly sorted, loose to medium dense; Grades to gravelly fine to coarse sand mixture @ 34.5 ft bgs	
36							Not Sampled	
38		9	2.0			SP	10YR 5/8 yellowish brown mottled with 10YR 6/1 gray, fine to coarse sand, wet, medium dense; 4-inch clay layer with some sand @ 39.0 ft bgs	
40							Not Sampled	
42								
							Not Recovered	

Project: Dominion - Possum Point Power Station-SCR
Project Location: Dumfries, Virginia
Project Number: 21354933

Log of Borehole ED-23R

Elevation, feet / Downhole Depth, feet	SAMPLES: Type	SAMPLES: Number	SAMPLES: Recovery (feet)	SAMPLES: PID	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	FIELD NOTES
44		10	1.0			CL	Gley 1 5/5GY greenish gray, Clay, slightly moist to dry, stiff	
46							Not Sampled	
48							Not Recovered	
		11	1.5			CL	Gley 1 5/5GY greenish gray, Clay with trace fine sand, slightly moist to dry, stiff to very stiff; 49-49.5 ft bgs; 10YR 3/4 dark yellowish brown	
50							Not Sampled	
52								
54		12	2.0			CL	Gley 1 4/5GY dark greenish gray, Clay, slightly moist to dry, stiff	
						CL	Gley 1 6/5GY greenish gray, very fine sandy Clay, slightly moist to dry, stiff	
56							Not Sampled	
58		13	2.0			CL	Gley 1 4/5GY greenish gray, Clay, slightly moist to dry, very stiff, hard, slight plasticity	
60							Terminated borehole 62.0 ft bgs	
62								
64								
66								

URS

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS- CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK.
DRILLING METHODS: 6" HSA, 2' SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ED-22RA
SHEET 1 OF 2
DATE: START 9/21/16 END 9/22/16
ELEV: 23.78'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6886085.83 / Easting 11827288.96 REMARKS
0.0		2						SANDY SILT, MED. BROWN	
	S-1	2	2.0	—	3.5	ML	M		
		4							
2.0		8							
2.5								2.5	
		5					M	SILTY FINE SAND, LIGHT	
	S-2	10	2.0	—	—	SP	TO	ORANGEISH BROWN	
		9					DRY		
4.5		7							
5.0								5.0	
		6						CLAYEY SILT, SOME SAND, ORANGEISH	
	S-3	7	1.4	—	<1.0	ML	M	BROWN, TO LIGHT BROWN, TO DARK	
		9						GRAYISH BROWN	
7.0		11							
7.5								7.5	
		4						SANDY CLAY- BROWNISH GRAY	
	S-4	6	2.0	—	>4.5	CL	M	TO BROWNISH ORANGE	
		13							
9.5		8							
10.0									
		5							MAY BE WET -
	S-5	5	2.0	—	>4.5	CL	M		AUGERS HOT
		6							
12.0		12							
12.5									ΔH2O LEVEL IN
		5							AUGERS: 11.0 ft.
	S-6	5	1.5	—	—	SP	M	13.5	
		12						FINE - MEDIUM SAND, LIGHT GRAY	
14.5		12						TO ORANGEISH BROWN	
15.0								15.0	
		6						CLAYEY SAND, MICACEOUS, WITH	
	S-7	6	1.5	—	—	SC	M	SOME SHELL FRAGMENTS	SPOON WET IN
		8						LIGHT BROWN	LENSES
17.0		9							
17.5									
		5						-ORANGEISH BROWN	
	S-8	3	2.0	-	-		M		
		6						19.0	
19.5		5				SP		FINE-MEDIUM SAND, ORANGEISH BROWN	

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS- CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO.
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ED-22RA
SHEET 2 OF 2
DATE: START 9/21/16 END 9/22/16
ELEV: 23.78'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20		5			–	SP	M	(SAND CONT.)	
	S-9	6	2.0	–				21.0	
		6			1.5	CL	M	21.5 SANDY CLAY, LIGHT GRAYISH BROWN	
22		8			–	SP		SAND & CLAYEY SAND, ORANGEISH BROWN	
22.5									
		3							
	S-10	4	2.0	–	–	SP/SC	M		
		6							
24.5		4							
25.0									
		4				SP/SC			
	S-11	3	2.0	–	–		M TO W		
		3							
27.0		5							
27.5									
		3				SP/SC	W TO S		WET SPOON
	S-12	5	2.0	–	–				
		6							
29.5		7							
30.0									
		2				SP/SC	W TO S		
	S-13	3		–	–				
		7							
32.0		7						32.0' END	

MONITORING WELL INSTALLATION NOTES

#20 SAND 32-31'. 5' SCHEDULE 40 PVC 10-SLOT SCREEN 31-26'. RISER PIPE FROM 26' TO 3' ABOVE SURFACE.

#20 SAND TO 21' (5' ABOVE TOP OF SCREEN), THEN BENTONITE CHIP SEAL 21'-3'. STEEL PROTECTIVE CASING CONCRETED IN PLACE. LOCKING CAP. 2x2' CONCRETE PAD INSTALLED AROUND STEEL CASING. WELL DEVELOPED ON 10/12.

Project: Dominion - Possum Point
Project Location: Possum Point , Virginia
Project Number: 49498-018-155

Key to Hollow Stem Auger Boring Log

Sheet

Elevation feet	Depth, feet	SAMPLES: Type	SAMPLES: Number	Blow Counts	% Recovery	PID (ppm)	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Well Det.	FIELD NOTES AND WELL DETAILS
1	2	3	4	5	6	7	8	9	10	11	12

COLUMN DESCRIPTIONS

1 **Elevation:** Elevation in feet referenced to mean sea level (MSL) or site datum.

2 **Depth:** Depth in feet below the ground surface.

3 **Sample Type:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

4 **Sample Number:** Sample identification number.

5 **Sampling Resistance:** Number of blows to advance driven sampler each 6-inch drive interval, or distance noted, using a 140-lb hammer with a 30-inch drop; "NA" indicates data not recorded.

6 **Recovery:** Percentage of driven sample length actually recovered in sampler; "NA" indicates data not recorded.

7 **"N" Value:** The sum of the second and third blow count values

8 **Graphic Log:** Graphic depiction of subsurface material encountered; typical symbols are explained below.

9 **USCS Code:** Unified Soil Classification System (USCS) group symbol code for associated soil strata.

10 **Material Description:** Description of material encountered; may include color, moisture, grain size, and density/consistency.

11 **Well Det.:** Schematic of well installation; materials are listed in header block and alongside well schematic; graphic symbols are explained below.

12 **Field Notes and Well Details:** Comments and observations regarding drilling or sampling made by driller or field personnel. Well construction materials and installation details are also listed in this column.

TYPICAL SOIL GRAPHIC SYMBOLS

poorly graded, SAND

SANDY CLAY

CLAYEY SAND to SANDY CLAY

SANDY SILT to SANDY CLAY

TYPICAL WELL GRAPHIC SYMBOLS

Blank casing in grout

Blank casing in bentonite

Blank casing in sandpack

Slotted screen in sandpack

TYPICAL SAMPLER GRAPHIC SYMBOLS

OTHER GRAPHIC SYMBOLS

Static water level measured after well installation.

Minor change in material properties with in a lithologic stratum

GENERAL NOTES

Report ENV_12W_CLEVELAND_W/USCS_KEY; File DOMINION-POSSUM POINT.GPJ; 11/19/2002 Boring Key

URS

Project: Dominion - Possum Point
Project Location: Possum Point , Virginia
Project Number: 49498-018-155

ED-9R2

Sheet 1 of 3

Date(s) Drilled and Installed	11-13-02 to 11-14-02	Logged By	M. Welch	Reviewer	T. LaMaskin
Drilling Method	4 1/4-inch I. D. Hollow Stem Auger	Drilling Contractor	Fishburne Drilling	Total Depth of Borehole	80.0 feet
Sampling Method	2-inch I.D. Split Spoon	Drill Bit Size/Type	NA	Top of Casing Elevation	
Size and Type of Well Casing	2-inch I.D. Schedule 40 PVC	Screen Perforation	0.010-inch	Approximate Surface Elevation	
Seal or Backfill	Bentonite Pellets/Bentonite-cement grout	Groundwater Level(s)	54.61 bgs		

Elevation feet	Depth, feet	SAMPLES Type	Number	Blow Counts	% Recovery	"N" Value	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Well Det.	FIELD NOTES AND WELL DETAILS
	0										poorly graded, SAND
			1	4-6-9-8	75	15		SC	Medium dense, 7.5YR 5/8, strong brown, fine (0.25-0.5mm), CLAYEY SAND, moist		
	5										
			2	1-3-3-5	25	6		SC	Medium stiff, 7.5YR 6/8, reddish yellow, 0.25-0.5mm, CLAYEY SAND, trace (15mm) rounded gravel, moist		
								CL	Mottled 5YR 4/4, reddish brown and 5YR 6/1, gray, fine, CLAY with sand, moist		
	10										
			3	1-4-5-7	75	9		CL	Stiff, mottled GLEY 1, 6/5GY, greenish gray, 2.5YR 4/8, red, fine, SANDY CLAY, moist		
								CL	2.5YR 3/2, dusky red, iron concretion, dry, brittle		Grout: 90% Portland/10% Bentonite
	15										
			4	5-5-7-15	100	12		CL	Stiff, mottled 2.5YR 4/4, reddish brown, and GLEY 2 6/10G, greenish gray, very fine (0.06-0.12mm), SANDY CLAY, dry/moist		
	20										
			5	3-10-12-14	100	22		CL	Very stiff, mottled 2.5YR 4/6, red and GLEY 2 5/10G, greenish gray, very fine (0.06-0.12mm), SANDY CLAY, dry		
	25										
			6	6-14-19-20	100	33		CL	Hard, mottled 2.5YR 4/4, reddish brown and GLEY 2 5/10G, greenish gray, very fine (0.06-0.12mm), SANDY CLAY, dry		
	30										

URS

Report ENV_RIC_BORING_LOG+/USCS; File: DOMINION-POSSUM POINT GPJ; 11/19/2002 ED-9R2

Project: Dominion - Possum Point
Project Location: Possum Point , Virginia
Project Number: 49498-018-155

ED-9R2

Sheet 2 of 3

Elevation feet	Depth, feet	SAMPLES: Type	Number	Blow Counts	% Recovery	"N" Value	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Well Det.	FIELD NOTES AND WELL DETAILS
	30										
			7	6-12-15-16	100	27		ML	Less stiff, mottled 5YR 4/4, reddish brown, GLEY 2 5/10G greenish gray, SANDY SILT, dry		
	35										Grout: 90% Portland/10% Bentonite
			8	10-14-17-20	100	31		ML	Hard, mottled, 5YR 4/4, reddish brown, GLEY 2 5/10G greenish gray, SANDY SILT, dry		
	40										Augers grinding
			9	9-18-23-28	100	41		ML	Hard, mottled 5YR 4/4, reddish brown, GLEY 2 5/10G greenish gray, GLEY 1 3/1, very dark greenish gray, SANDY SILT, dry		
	45										
			10	7-16-20-21	100	36		SC/CL	GLEY 1 5/5G, greenish gray, fine (0.12-0.25mm), CLAYEY SAND/SANDY CLAY, dry		
	50										3/8-inch Hydrated Bentonite Pellets
			11	5-5-12-15	100	17		SC	Medium dense, GLEY 1 6/10GY, greenish gray, fine (0.25-0.5mm), CLAYEY SAND, moist		Upper Potomac Aquifer - Cretaceous Period-Mesozoic Era
	55										No. 2 Silica Quartz Sandpack
			12	4-12-20-26	100	32		ML/CL	GLEY 1 5/5G greenish gray, SANDY SILT, dry and 5Y 5/3, olive, SANDY CLAY, dry		
								SC	5Y 7/3, pale yellow with dark red zones of oxidation, medium (0.25-1mm), CLAYEY SAND, dry		
	60							SP	5Y 6/3, pale olive, medium (0.5-1mm), poorly graded, SAND, moist		Driller noted water for first time at 10:47am
			13	8-16-19-26	100	35		SP	Dense, 5Y 6/3, pale olive, medium (0.5-1mm), subrounded grains, poorly graded, SAND, wet	▽	
	65										

Report ENV_RIC_BORING_LOG+/USCS; File: DOMINION-POSSUM POINT.GPJ; 11/19/2002 ED-9R2

URS

Project: Dominion - Possum Point
Project Location: Possum Point , Virginia
Project Number: 49498-018-155

ED-9R2

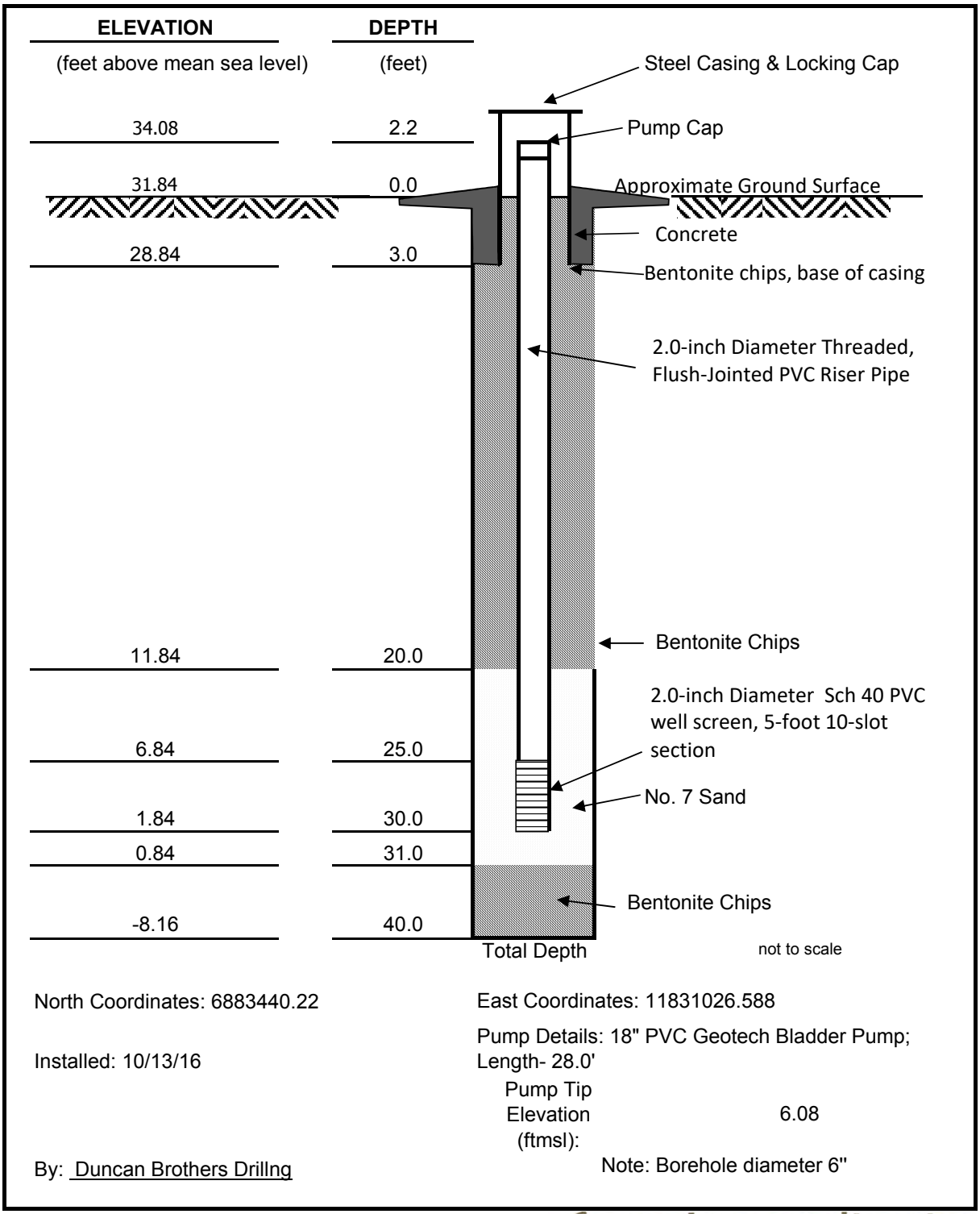
Sheet 3 of 3

Elevation feet / Depth, feet	SAMPLES: Type Number	Blow Counts	% Recovery	"N" Value	Graphic Log	Lithologic Log (USCS Code)	MATERIAL DESCRIPTION	Well Det.	FIELD NOTES AND WELL DETAILS
65									
	14	10-20-29-37	100	49		SP	Dense, 5Y 6/3, pale olive, medium (0.5-1mm), subrounded grains, poorly graded, SAND, wet		
70									←Screen: 20 feet of 0.01-inch Factory Slotted, Sch 40, 2-inch PVC
	15	12-18-20-23	100	38		SP	Dense, 5Y 6/3, pale olive, medium (0.5-1mm), subrounded grains, poorly graded, SAND, wet		
						SC	Pale olive with reddish brown zones of oxidation, fine (0.25-0.5mm), CLAYEY SAND, moist		
75									
	16	15-25-31-36	83	56		SP	Very dense, 2.5YR 7/2, light gray, medium (0.5-2mm), rounded (5mm), quartzite gravel, poorly graded SAND with gravel, wet		
80							Borehole terminated at 80 feet bgs. Groundwater well ED-9R2 constructed within borehole. Static water level 58.11 feet from top of casing on 11-13-02. 2'x2'x4" concrete well pad and 4"x4" protective steel casing constructed. Approximately 2.5-feet of PVC well pipe stick-up above the ground surface.		
85									
90									
95									
100									

Report ENV_RIC_BORING_LOG+/USCS: File: DOMINION-POSSUM POINT.GPJ; 11/25/2002 ED-9R2

URS

Monitoring Well ABC-1602
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6883440.22

East Coordinates: 11831026.588

Installed: 10/13/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 28.0'

Pump Tip Elevation (ftmsl): 6.08

By: Duncan Brothers Drillng

Note: Borehole diameter 6"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Boss/Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC 09-041)
DRILLING METHODS: Sonic Drilling with 6" outer and 4" inner and 5' runs
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. ABC-1602
SHEET 1 OF 2
DATE: START 10/12/16 END 10/13/16
ELEV: 31.84'

Northing	Easting
6883440.22	11831026.59

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
0.0								1.0' Topsoil	
	S-1	-	3.0	60		SM	moist	Silty SAND, fine grained, light brown to tan, little orange mottling. [Alluvium]	
5.0	S-2	-	5.0	100			moist	- trace medium grained, rounded to subrounded gravel.	
10.0								10.7'	
	S-3	-	5.0	100	74.5	CH	dry	Fat CLAY, some well graded subrounded to rounded gravel, gray mottled orange.	
								13.0'	
						SC		14.6' Clayey SAND, fine grained, Orange	
15.0	S-4	-	5.0	100	74.5	CH	dry	Fat CLAY, trace fine grained sand, gray / dark green / reddish brown, Blocky, hard.	
20.0								20.0'	
	S-5	-	5.0	100		SM	damp	Silty SAND, fine grained, gray little orange mottling.	
								23.0'	
						CH		Fat CLAY, trace fine grained sand.	
25.0								25.4' Brown / gray / orange, hard.	
	S-6	-	5.0	100		SP-SM	damp	Silty SAND, Poorly graded, Fine grained, tan to gray	
30.0								30.5	
	S-7	-	5.0	100	74.5	CH	dry	Fat CLAY, homogeneous, dark gray, hard.	
35.0	S-8	-	5.0	100	74.5		dry		Very difficult to extract from barrel
40.0								40.0	

Boring Terminated @ 40.0'

BORING LOG

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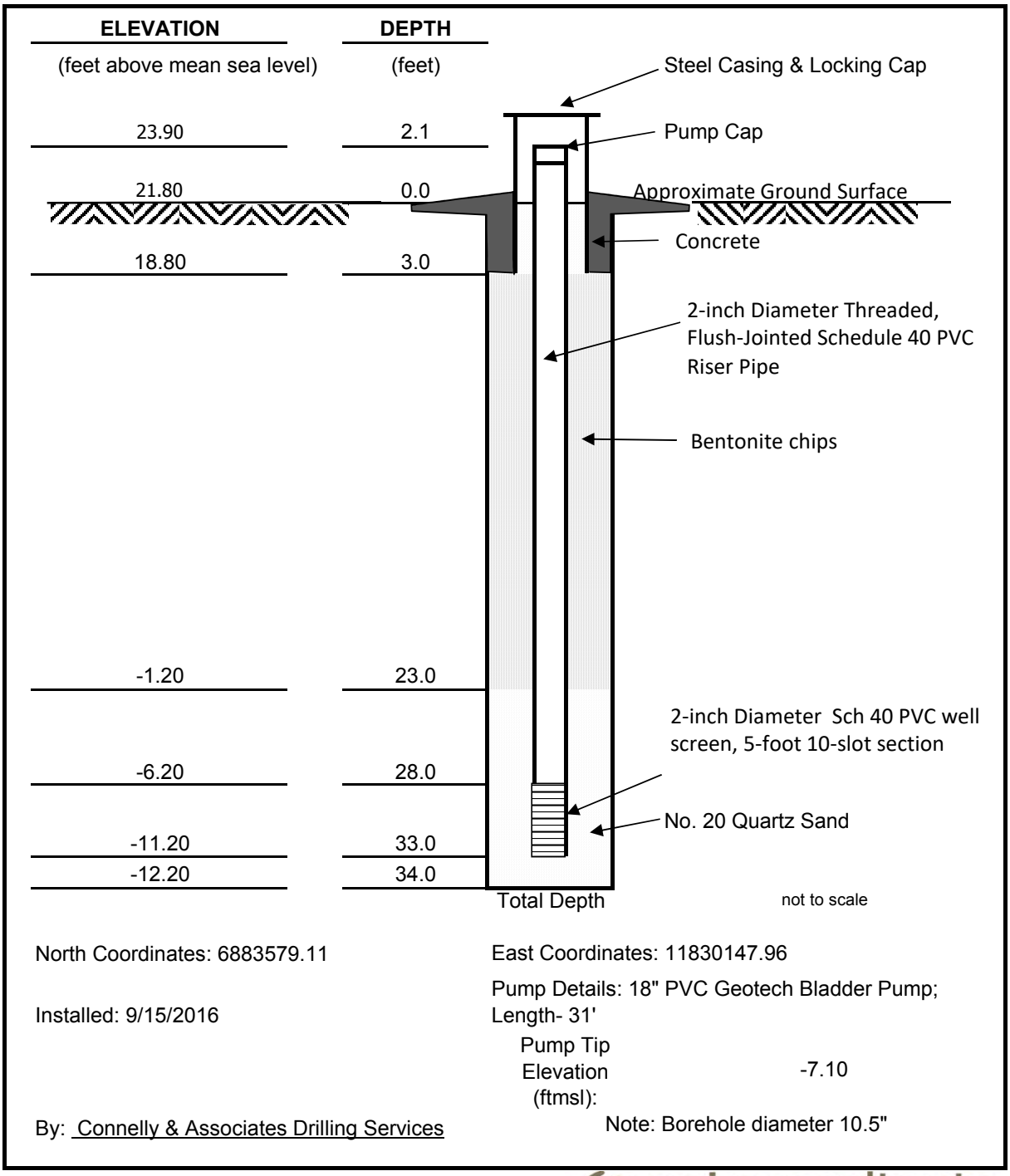
PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

BORING NO. ABC-1602
SHEET 2 OF 2
DATE: START 10/12/16 END 10/13/16
ELEV: 31.84'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
								Well Construction: #7 Sand Placed from 31' to 20.0', Well Set at 30.0' with 5.0' of SCH40 2.0" well, Screen from 30.0 to 25.0'. Bentonite Chip from 20.0 to 3.0' Bentonite plug from 40.0' to 31.0'. allowed to hydrate overnight	

ABC-1607
Possum Point Power Station
Dominion Transmission, Inc.
Record Detail



North Coordinates: 6883579.11

East Coordinates: 11830147.96

Installed: 9/15/2016

Pump Details: 18" PVC Geotech Bladder Pump; Length- 31'

Pump Tip Elevation (ftmsl): -7.10

By: Connelly & Associates Drilling Services

Note: Borehole diameter 10.5"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS - CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO.
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ABC-1607
SHEET 1 OF 3
DATE: START 9/15/16 END 9/15/16
ELEV: 21.8'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6883579.11 / Easting 11830147.96 REMARKS
0		4						SANDY SILT, TAN TO DARK BROWN	
	S-1	9	1.8	—	—	ML	DRY		
		8							
2.0		10							
2.5								2.5	
		9						CLAY - SILT - SAND, TAN	
	S-2	8	2.0	—	—		DRY		
		7							
4.5		8							
5.0								5.0	
		7						CLAY, TRACE SAND, LIGHT GRAY	
	S-3	6	1.0	—	4.5	CL	M	WITH ORANGE MOTTLING	
		7							
7.0		8							
7.5								7.5	
		8				ML		SILT + V. FINE SAND, LIGHT GRAY	
	S-4	6	1.9	—	—		M	8.5	
		9						V. FINE SAND, LIGHT GRAY	
9.5		10				SP		FINE - MEDIUM SAND, LIGHT GRAY	
10.0								TO GRAYISH TAN	
		5							
	S-5	4	1.5	—	—	SP	M	- ORANGEISH BROWN	
		5							
12.0		5							
12.5									
		6				SW		MEDIUM SAND - ORANGEISH BROWN	
	S-6	4	1.5	—	—	↓	M	FINE SAND - LIGHT GRAYISH TAN	
		5						V. FINE SAND - LIGHT GRAY	
14.5		6				SC		CLAYEY V. FINE SAND - LIGHT GRAY	
15.0									
		5				SM		SILTY FINE SAND, TRACE CLAY, LIGHT TAN	
	S-7	3	2.0	—	—		M	SILTY V. FINE SAND, LIGHT GRAYISH TAN	
		3				SC		CLAYEY V. FINE SAND, LIGHT TAUPE	
17.0		13				SP		MEDIUM SAND, ORANGEISH BROWN	
17.5									
		4						18.0 SILT + SAND, TAN	
	S-8	6	1.5	—	—	SW	M	FINE TO COARSE SAND, TRACE ROUNDED GRAVEL (<0.25")	
		8							
19.5		7							

BORING LOG

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PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS- CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

BORING NO. ABC-1607
SHEET 2 OF 3
DATE: START 9/15/16 END 9/15/16
ELEV: 21.8'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20.0		4					M	V. FINE TO MEDIUM SAND, LIGHT	
	S-9	4	2.0	—	—	SP	TO	GRAYISH TAN TO ORANGEISH BROWN,	
		6					W	TRACE ROUNDED GRAVEL (< ½" ϕ)	
22.0		6							
22.5									
		3							
	S-10	4	2.0	—	—	SP	S		
		5							
24.5		9							
25.0								25.0	
		3						FINE- COARSE SAND, SOME CLAY	
	S-11	4	2.0	—	—	SW/SC	W	IN POCKETS	
		5							
27.0		4							
27.5									
		5						- SOME SILT	
	S-12	4	2.0	—	—	SP	S		
		6						- 28.5 CLAY (2" THICK)	
29.5		7							
30.0									
		2							
	S-13	5	2.0	—	—	SP	S	SOME V. FINE SAND	
		4							
32.0		5							
		4							
	S-14	17	2.0	—	—	SP	S		
		15						33.5	
34.0		13				GP		COARSE GRAVEL (ROUNDED) & SAND	
								ORANGEISH BROWN, LIGHT GRAY	
								34.0	
								END 34.0'	
								(NOTES ON NEXT PAGE)	

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS- CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2" SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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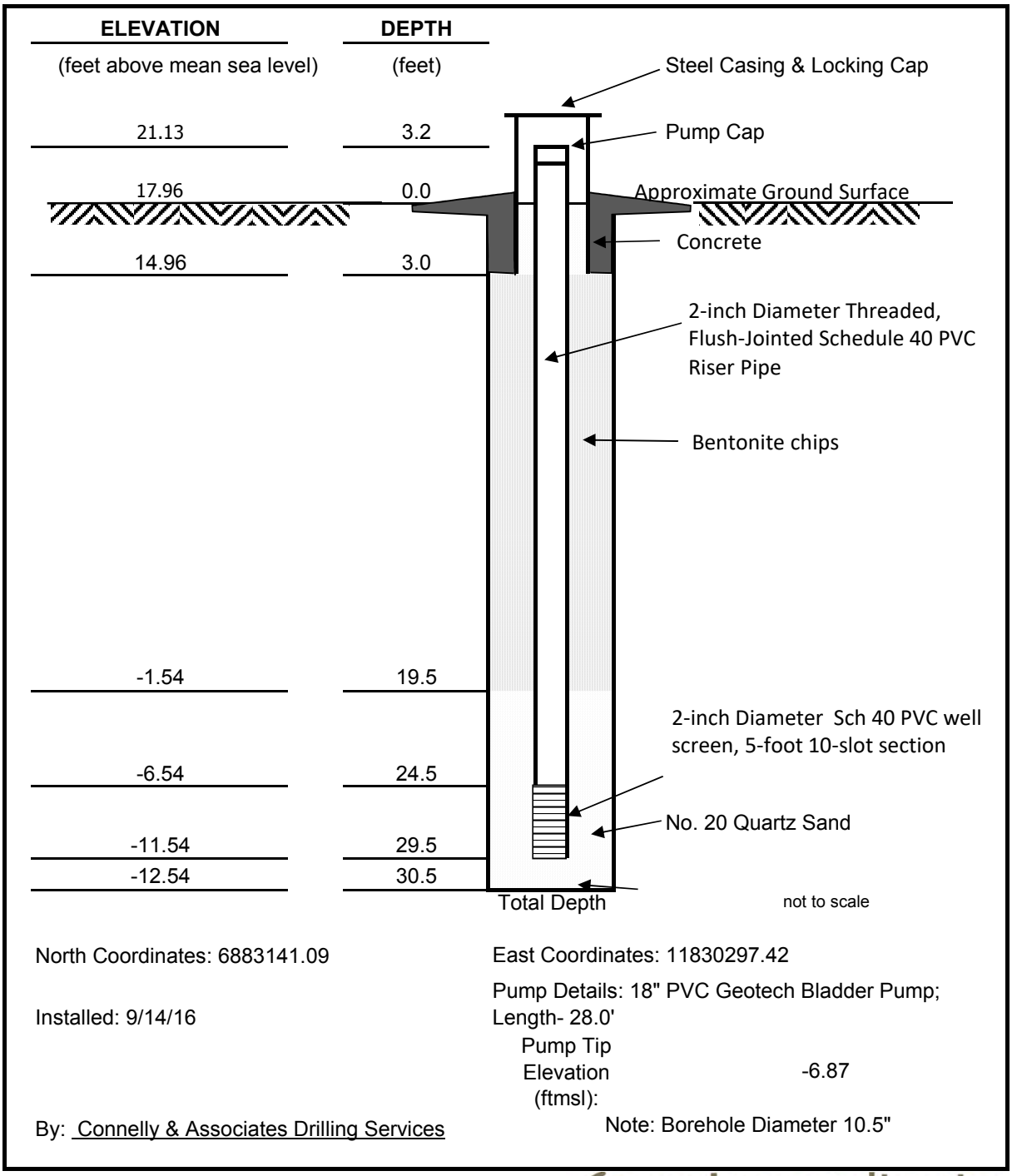
BORING NO. ABC-1607
SHEET 3 OF 3
DATE: START 9/15/10 END 9/15/10
ELEV: 21.8'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
								MONITORING WELL INSTALLATION NOTES 5 FEET OF 10-SLOT SCHEDULE 40 PVC SCREEN INSTALLED AT 33' WITH ONE FOOT OF #2.0 SAND BELOW THE SCREEN TIP FROM 33-34'. PVC RISER PIPE TO 3' ABOVE GROUND SURFACE. #20 SAND TO 5' ABOVE THE SCREEN FROM 23-34', BENTONITE CHIP SEAL FROM 3'-23'. PROTECTIVE STEEL CASING WITH LOCKING CAP INSTALLED AROUND THE PVC STICKUP AND CONCRETED INTO PLACE. 2x2' CONCRETE PAD + 4 BOLLARDS CONCRETED AT CORNERS. WELL WAS DEVELOPED ON 10/12 WITH A SUBMERSIBLE PUMP.	

ABC-1608
Possum Point Power Station
Dominion Transmission, Inc.
Record Detail



North Coordinates: 6883141.09

East Coordinates: 11830297.42

Installed: 9/14/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 28.0'

Pump Tip Elevation (ftmsl): -6.87

By: Connelly & Associates Drilling Services

Note: Borehole Diameter 10.5"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY JEREMY - CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO.
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ABC-1608
SHEET 1 OF 2
DATE: START 9/14/16 END 9/14/16
ELEV: 17.96'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6883141.09 / Easting 11830297.42 REMARKS
0		6						TOPSOIL 0-0.2' GRAYISH BROWN	
	S-1	7	2.0	—	>4.0	ML/CL	M-D	SILT & CLAY, SOME SAND, TAN	
		8							
2.0		8							
2.5								2.5	
								CLAY & SILT, LIGHT GRAYISH TAN	
	S-2		2.0	—	>4.0	CL	M-D		
4.5									
5.0									
		6					M-		
	S-3	8	2.0	—	>4.0	CL	D		
		11							
7.0		14							
7.5								7.5	
		8				SC		FINE SAND W/ CLAY, LIGHT	
	S-4	7	2.0	—	3.5	/CL	M	8.5 GRAY W/ ORANGE MOTTLING	
		9						CLAY, SOME SAND, GRAYISH BROWN	
9.5		13				-			
10.0								10.0	
		7			1.0	SM		SAND & SILT, LIGHT TAN TO LIGHT	
	S-12	7	2.0	—	-		M	GRAYISH BROWN, TRACE ROUNDED GRAVEL	
		9			3.5			11.5	
12.0		12				SC/CL		CLAY & SAND, DARK BROWNISH GRAY	
12.5								12.5	
		4					M	SANDY CLAY, ORANGEISH BROWN TO	
	S-13	5	2.0	—	<1.0	CL	TO	DARK GRAYISH BROWN W/ POCKETS	
		4					W	OF CLEAN FINE SAND	
14.5		5							
15.0									
		4					M	LIGHT GRAYISH TAN	
	S-14	8	2.0	—	1.0	SC			
		12						16.8	
17.0		14				SP	W	MEDIUM SAND, LIGHT BROWN	
17.5								17.5	
		4						CLAYEY SAND, LIGHT GRAYISH BROWN	
	S-15	3	2.0	—	—	SC	W		
		2						19.0	
19.5		3				SM	W	SILTY SAND, LIGHT GRAYISH BROWN	

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRES VA
DRILLER NAME/COMPANY JEREMY - CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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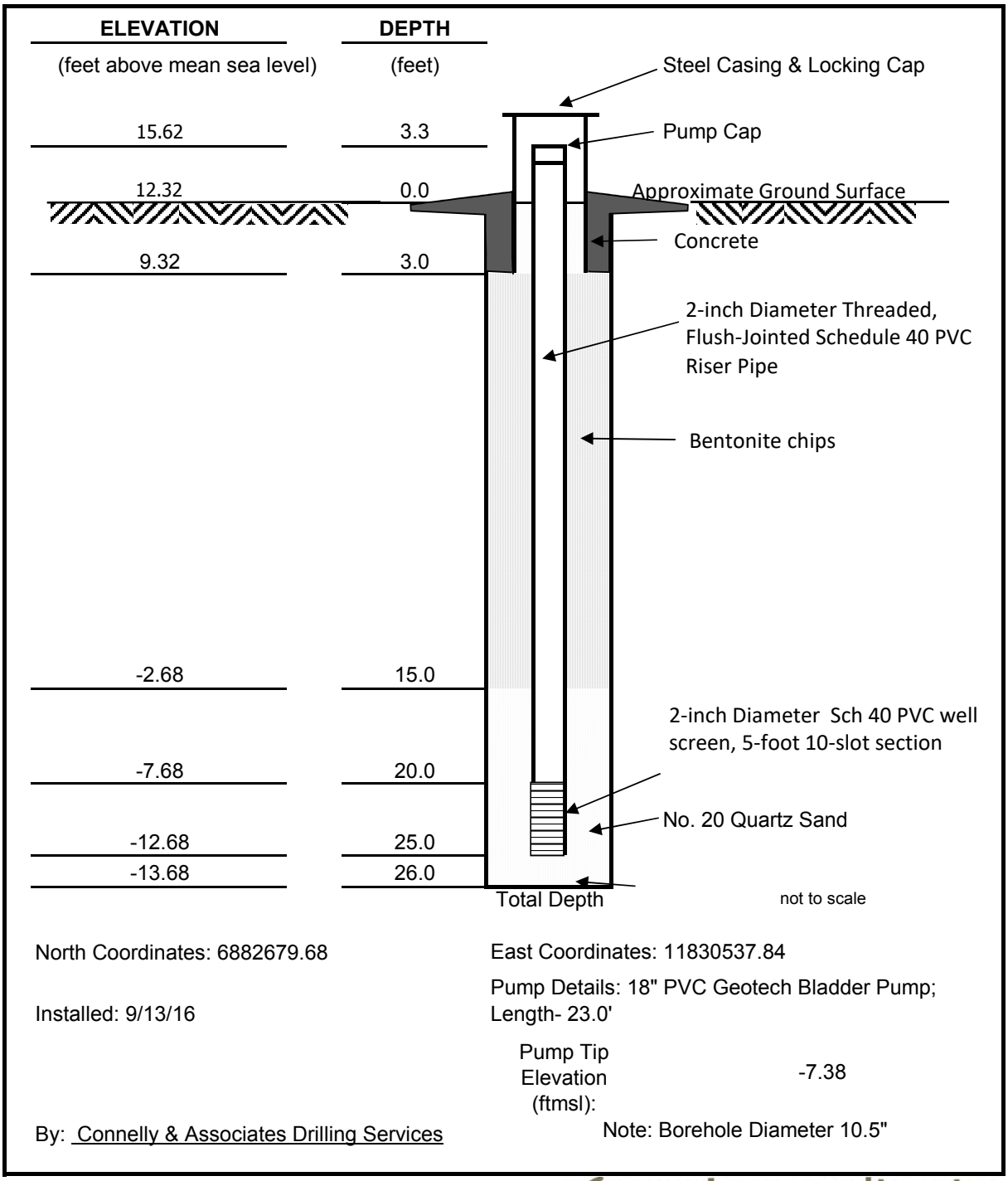
BORING NO. ABC-1608
SHEET 2 OF 2
DATE: START 9/14/16 END 9/14/16
ELEV: 17.96'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20		4					W	FINE-COARSE SAND, TRACE ROUNDED	
	S-8	7	2.0	—	—	SP	TO	GRAVEL, LIGHT GRAY	
		8					S		
22.0		11						22.0	
22.5								INTERBEDDED SAND & CLAYEY SAND,	
		1				SP	W	FINE-COARSE, GRAYISH BROWN	
	S-9	1	2.0	—	—	/	TO		
		1				SC	S		
24.5		1							
25.0									
		4					S	25.5	
	S-10	7	2.0	—	0	CL		CLAY, GRAYISH BROWN	
		8					W		
27.0		10							
27.5									
		5							
	S-11	4	2.0	—	2.5	CL	W		
		6							
29.5		9						29.5	
								END	
								NOTES	
								AUGERED TO 30.5, #20 SAND PACK	
								29.5-30.5. TIP OF SCREEN SET	
								@ 29.5. FIVE FT. SCREEN. #20 SAND	
								TO 5' ABOVE SCREEN (19.5'-29.5').	BENTONITE CHIPS
							TO	3' BELOW GROUND SURFACE. STEEL	
								PROTECTIVE CASING CONCRETED	
								IN PLACE. LOCKING CAP. 2x2'	
								CONCRETE PAD INSTALLED. NO	
								BOLLARDS NECESSARY DUE TO	
								LOCATION IN THE WOODS.	
								DEVELOPED ON 10/12.	

ABC-1614
Possum Point Power Station
Dominion Transmission, Inc.
Record Detail



North Coordinates: 6882679.68

East Coordinates: 11830537.84

Pump Details: 18" PVC Geotech Bladder Pump; Length- 23.0'

Installed: 9/13/16

Pump Tip Elevation (ftmsl): -7.38

By: Connelly & Associates Drilling Services

Note: Borehole Diameter 10.5"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO.
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ABC-1614
SHEET 1 OF 2
DATE: START 9/13/16 END 9/13/16
ELEV: 12.32'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6882679.68 / Easting 11830537.84 REMARKS
0		5					M	0.3' TOPSOIL 0-0.3'	
	S-1	9	1.0	—	—	ML	TO	SANDY SILT LIGHT GRAYISH	
		7					D	BROWN TO LIGHT TAN	
2.0		6							
2.5									
		8					M		
	S-2	10	1.0	—	—		TO	-WITH CLAY	
		12					D		
4.5		13							
5.0								5.0	
		4						SILT, SAND, & CLAY, LIGHT GRAY	
	S-3	9	1.5	—	>4.0		M	W/ ORANGE-BROWN MOTTLING	
		11							
7.0		12							
7.5								7.5	
		8			2.0			SILTY SAND, LIGHT BROWN	
	S-4	8	1.1	—	-4.0	SM	M		
		8					TO		
9.5		7				-	W?		
10.0									
		1				SM/SC		-WITH CLAY & ORANGE MOTTLING	
	S-5	1	0.9	—	—		M		
		2							
12.0		2							
12.5								12.5	
		1				CL/SM	M	INTERBEDDED CLAY & SAND	
	S-6	2	0.5	-	1.0		TO	(LIGHT GRAY CLAY, ORANGE-BROWN	
		2					W	SAND)	
14.5		2							
15.0								15.0	
		1					M	CLAY & SAND, LIGHT GRAY	
	S-7	3	1.8	—	<1.0	SC	TO		
		2					W		
17.0		1							
17.5								17.5	
		4						FINE-MEDIUM SAND, LIGHT GRAY	
	S-8	7	1.5	—	—	SP	S		
		6							
19.5		9							

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CINNELLY
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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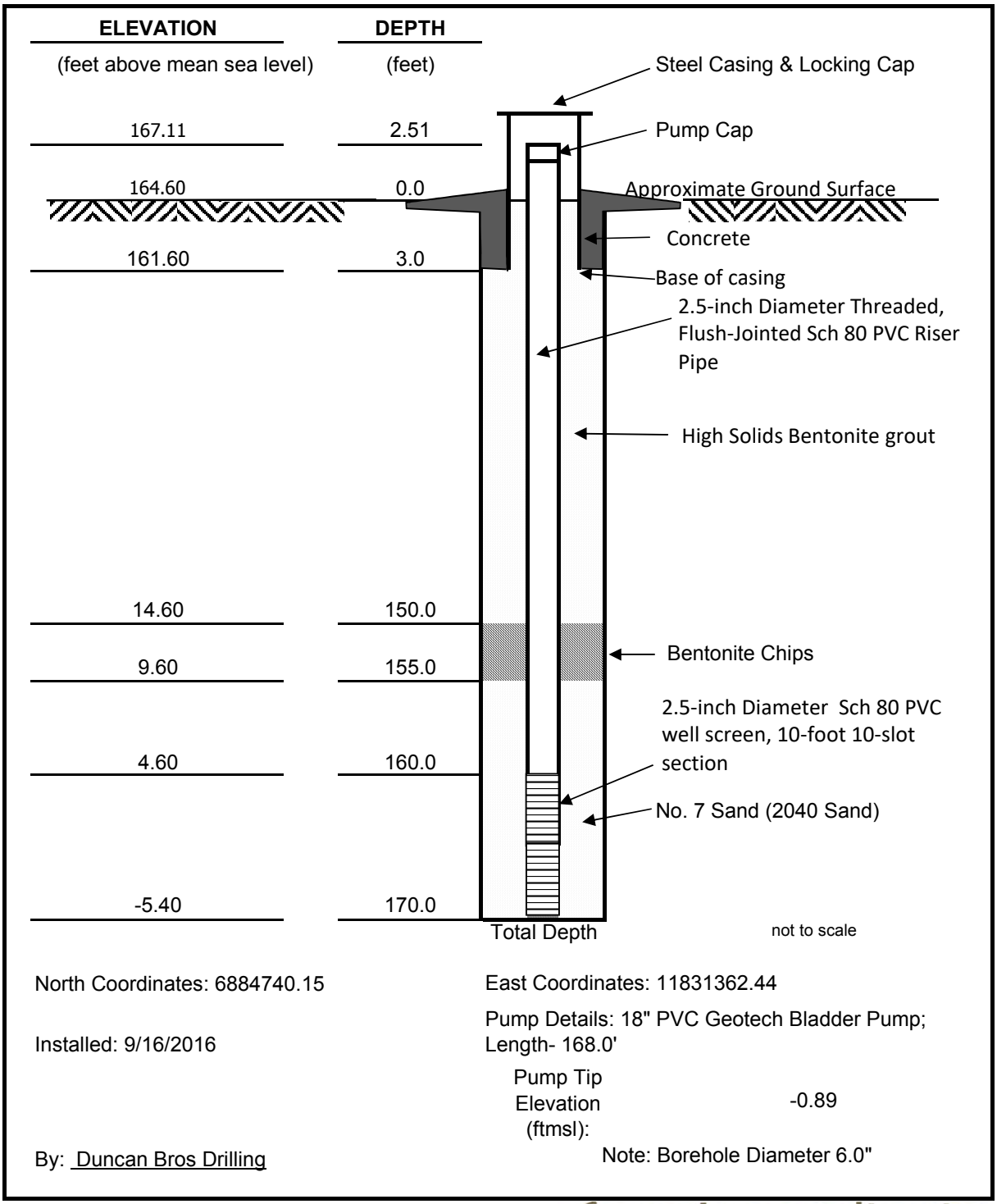
BORING NO. ABC-1614
SHEET 2 OF 2
DATE: START 9/13/16 END 9/13/16
ELEV: 12.32'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20.0								20.0	
		WOH						SILTY SAND, LIGHT GRAY	
	S-9	3	2.0'	—	—	SM	S		
		2							
22.0		1							
22.5									
		1							
	S-10	1	0.8	—	—		S		
		2						24.3	
24.5		2			1.5	CL	M	CLAY, GRAY	
25.0								25.0'	
								NOTES AUGER TO 26.0', #20 SAND 25.0-26.0'. FIVE FEET SCHEDULE 40, 10-SLOT SCREEN 25-20'. #20 SAND TO 15.0'. BENTONITE CHIP SEAL ON TOP OF SAND TO 3' FROM SURFACE. STEEL PROTECTIVE CASING WITH LOCKING CAP INSTALLED AND CONCRETED IN PLACE. 2x2' CONCRETE PAD AND 4 BOLLARDS INSTALLED. WELL DEVELOPED ON 10/12.	

Monitoring Well ED-1605
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6884740.15

East Coordinates: 11831362.44

Installed: 9/16/2016

Pump Details: 18" PVC Geotech Bladder Pump; Length- 168.0'

Pump Tip Elevation (ftmsl): -0.89

By: Duncan Bros Drilling

Note: Borehole Diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00 .071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD 450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

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BORING NO. ED-1605
SHEET 1 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

Northing	Easting
6884740.15	11831362.44

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION (Soil: Group Name, Color, State, [Origin]; Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition)	REMARKS
0.0								0-2" TOPSOIL	
					—	SC	MOIST	FINE TO COARSE CLAYEY SAND, LIGHT BROWN	
								2.00	
			5.0	100 %	—	SM	MOIST	FINE TO COARSE SILTY SAND, ORANGE/LIGHT BROWN	
5.0									
			5.0	100 %					
10.0									
			5.0	100 %					
								14.00	
15.0									
			5.0	100 %	—	SP	MOIST	MEDIUM TO COARSE SAND, TRACE SILT, LIGHT BROWN	
20.0								20.00	

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. ED-1605
SHEET 2 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20.0									
			0	0	—	—	—	20' - 25' NO RECOVERY	HARDER MATERIAL ENCOUNTERED, START USING 6" OUTER BARREL AND WATER
25.0			5.0	100 %	—	SP	MOIST	25.00 FINE TO MEDIUM SAND, LIGHT BROWN/ORANGE	
30.0			5.0	100 %	—	SP	MOIST	30.00 FINE TO COARSE SAND, TRACE OF GRAVEL, LIGHT BROWN/ORANGE	COARSE SAND AND GRAVEL .13" TO 1" DIAMETER
35.0			5.0	100 %					
40.0									

BORING LOG

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PROJECT NO. C150132.00.71
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. ED 1605
SHEET 3 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0									
					—	SP	MOIST	(CONTINUED) FINE TO MEDIUM SAND LITTLE CLAY, LIGHT GRAY 42.00	
			5.0	100%	4.25	CH	DRY	SANDY FAT CLAY (FINE TO MEDIUM SAND), LIGHT GRAY 46.00	
45.0									
			5.0	100%	—	SP	MOIST	FINE TO COARSE SAND, LIGHT GRAY 51.50	
50.0									
			4.0	80%	—	SP	MOIST	FINE TO COARSE SAND, LITTLE CLAY, TRACE FINE GRAVEL, LIGHT GRAY/BROWN 56.00	
55.0									
			5.0	100%	—	SC	MOIST	FINE TO COARSE CLAYEY SAND, TRACE OF FINE GRAVEL 60.00	
60.0									

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. ED-1605
SHEET 4 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
60.0								SANDY CLAY (FINE TO MEDIUM SAND), TRACE GRAVEL, LIGHT GRAY/ORANGE	
			5.0	100%	—	CL	MOIST		
65.0								66.00	
			5.0	100%	—	CL/SM	MOIST	CLAY AND SILTY SAND (MEDIUM TO COARSE), SOME FINE GRAVEL, LIGHT BROWN/ORANGE	
70.0								70.00	
			0	0	—	—	—	NO RECOVERY	70'-73' NO RECOVERY
								73.00	☆ WATER AT 73'
			2.0	40%	—	SP	WET	FINE TO COARSE SAND, TRACE OF FINE GRAVEL, LIGHT BROWN	
75.0								75.00	
			5.0	100%	—	SM	WET	MEDIUM TO COARSE SILTY SAND, SOME FINE GRAVEL, LIGHT BROWN/ORANGE	
80.0								80.00	

BORING LOG

PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: STEVE COONEY REVIEWED BY: DATE:

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BORING NO. ED-1605
SHEET 5 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
80.0									
			5.0	100 %	2.5	CH	DRY	SANDY FAT CLAY (FINE TO MEDIUM SAND) LIGHT BROWN	
85.0								LIGHT GRAY / GREEN COLOR	
			5.0	100 %					
90.0								90.00	
			5.0	100 %	—	SM	MOIST	FINE TO COARSE SILTY SAND, LIGHT GRAY / GREEN	
95.0									
			5.0	100 %					
100.0								100.00	

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. ED-1605
SHEET 6 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
100.0			0	0	—	—	—	NO RECOVERY	100' – 103' NO RECOVERY
								103.00	
			2.0	40 %	—	SC	MOIST	FINE TO COARSE CLAYEY SAND, LIGHT GRAY / GREEN	
105.0								106.00	
								SANDY CLAY (FINE TO COARSE SAND), LIGHT GRAY/GREEN	
			5.0	100 %	4.5	CL	MOIST		
110.0								111.00	
								SANDY FAT CLAY (FINE TO MEDIUM SAND) LIGHT GRAY / GREEN	
			5.0	100 %	>4.5	CH	DRY		
115.0									
			5.0	100 %	>4.5	CH	DRY		
120.0									

BORING LOG

PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

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BORING NO. ED-1605
SHEET 7 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
120.0								(CONTINUED)	
			5.0	100 %	4.5	CH	MOIST	SANDY FAT CLAY (FINE TO MEDIUM), LIGHT GRAY/GREEN	
125.0			5.0	100 %	>4.5	CH	MOIST		
130.0								130.00 SANDY CLAY (FINE TO COARSE SAND), LIGHT GRAY/GREEN	
			5.0	100 %	3.75	CL	MOIST		
135.0								136.00 MEDIUM TO COARSE SILTY SAND, TRACE CLAY, LIGHT BROWN/ORANGE	
			5.0	100 %	—	SM	MOIST		
140.0								140.00	

BORING LOG

PROJECT NO. C150132.00, 071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2000 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC w/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

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BORING NO. ED-1605
SHEET 8 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
140.0					3.25	CL	MOIST	SANDY CLAY (MEDIUM TO COARSE SAND), LIGHT GRAY	
▼								141.50	* WATER AT 141.50'
			5.0	100%	—	SC	WET	MEDIUM TO COARSE CLAYEY SAND, LIGHT BROWN/ORANGE	
145.0								145.00	
								FINE TO COARSE SILTY SAND, TAN / LIGHT BROWN	
			5.0	100%	—	SM	WET		
150.0								150.00	
								FINE TO COARSE CLAYEY SAND, TRACE OF FINE GRAVEL, LIGHT BROWN	
					—	SC	WET		
			5.0	100%				153.00	
								SANDY CLAY (FINE TO MEDIUM SAND), SOME GRAVEL, LIGHT BROWN	
155.0					—	CL	MOIST		
								156.00	
			5.0	100%	—	SC	WET	MEDIUM TO COARSE CLAYEY SAND, SOME FINE GRAVEL, LIGHT GRAY/GREEN	VERY WELL ROUNDED GRAVEL RANGING FROM 0.13" TO .75" DIAMETER
160.0									

BORING LOG

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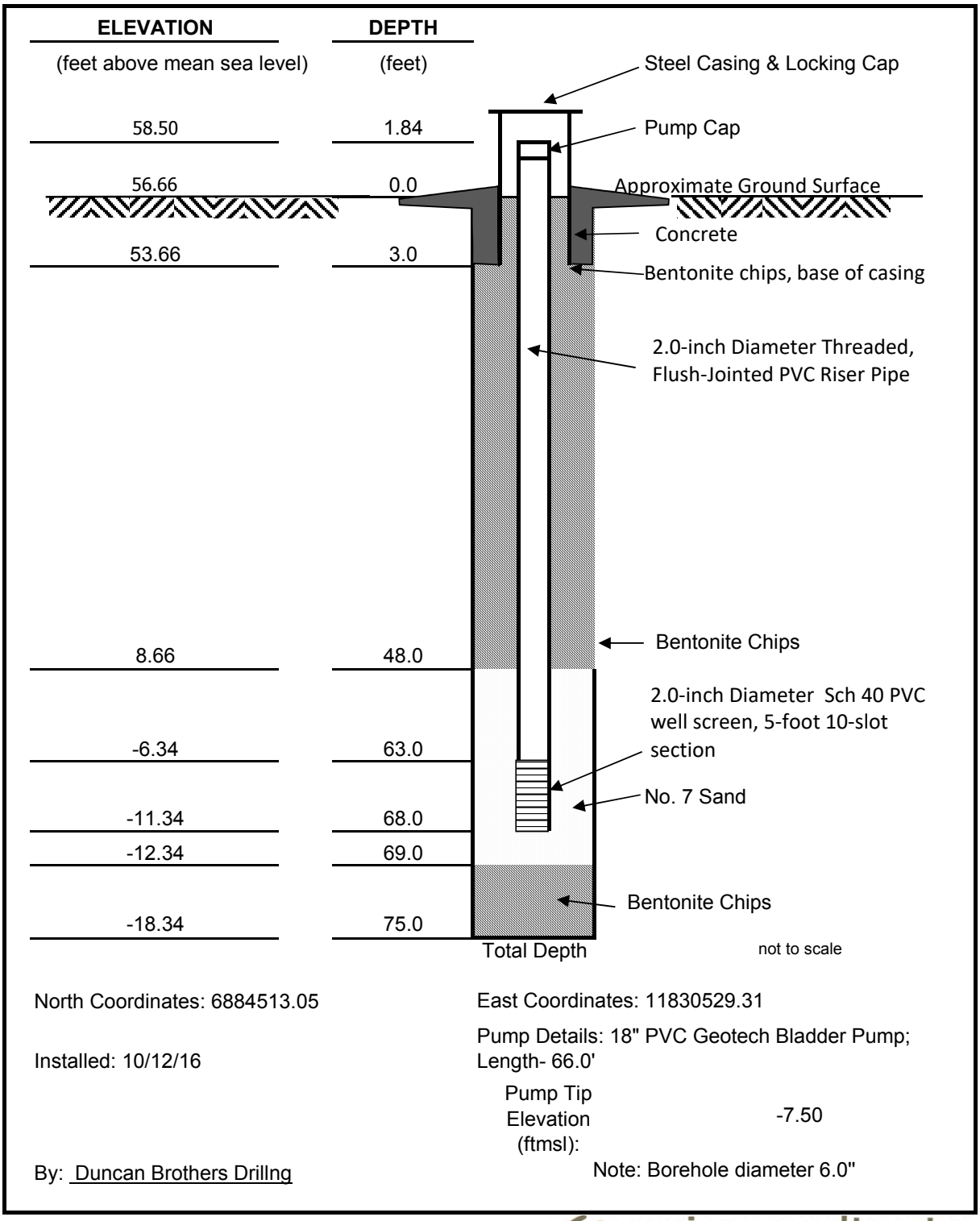
PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER CASING IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 46' DATE/TIME 9/16/16 11:00
24 HR WATER DEPTH 139' DATE/TIME 9/17/16 9:00
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. ED-1605
SHEET 9 OF 9
DATE: START 9/13/16 END 9/16/16
ELEV: 164.6'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
160.0						↑		(CONTINUED) ↑	
			5.0	100%	—	SC	WET	MEDIUM TO COARSE CLAYEY SAND, SOME FINE GRAVEL, LIGHT GRAY / GREEN	WELL ROUNDED GRAVEL (.13" – .75") DIAMETER
165.0									
			5.0	100%	—	SC	WET		
170.0								BORING TERMINATED 170.00	

WELL CONSTRUCTION –
SET WELL AT 170'. USE 10' OF SCH. 80 2.5" WELL SCREEN FROM 170' TO 160'. FILTER PACK CONSISTS OF #7 SAND FROM 170' TO 155'. BENTONITE SEAL WITH BENTONITE CHIPS (3/8") FROM 155' TO 150'. ALLOW BENTONITE TO HYDRATE OVERNIGHT. GROUT FROM 150' TO 3' BELOW GROUND SURFACE WITH TREMIE PIPE USING HIGH SOLIDS BENTONITE GROUT MIX ON 9/16/16.

Monitoring Well ED-1606
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6884513.05

East Coordinates: 11830529.31

Installed: 10/12/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 66.0'

Pump Tip Elevation (ftmsl): -7.50

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

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PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Ross / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drilling SD-450 (SN: SDC09-841)
DRILLING METHODS: Sonic Drilling with 6" outter and 4" inner barrel 5' run
PRE CORE WATER DEPTH ______ **DATE/TIME** ______
0 HR WATER DEPTH (POST CORE) ______ **DATE/TIME** ______
______ **HR WATER DEPTH** ______ **DATE/TIME** ______
______ **HR WATER DEPTH** ______ **DATE/TIME** ______
CLASSIFIED BY: DWM **REVIEWED BY:** ______ **DATE:** ______

BORING NO. ED-1606
SHEET 1 **OF** 3
DATE: START 10/11/16 **END** 10/12/16
ELEV: 56.66'

Northing	Easting
6884513.05	11830529.31

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
0.0–5.0	S-1	–	5.0	100	1.0	CL	moist	Lean CLAY, little organics, trace rounded to angular fine to medium grained gravel, medium to stiff, heterogeneous, [Fill]	[moderately sticky]
5.0–10.0	S-2	–	5.0	100	1.5		damp	- trace fine grained sand. 9.0'	
10.0–15.0	S-3	–	5.0	100	3.5	ML	damp	SILT, some fine grained sand, very stiff, gray mottled to orange. [Alluvium]	[non-sticky]
15.0–20.0	S-4	–	5.0	100			damp	16.3' Silty SAND, Poorly graded fine grained, orange to gray	
20.0–25.0	S-5	–	5.0	100		SP-SM	damp	- 22.3 becomes coarse grained - trace rounded medium grained gravel	
25.0–30.0	S-6	–	5.0	100			Moist	- Becomes fine grained	
30.0–35.0	S-7	–	5.0	100			Moist		
35.0–40.0	S-8	–	5.0	100		SM	Moist	36.4 Silty SAND. fine grained orange to gray.	

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. ED-1606
SHEET 2 OF 3
DATE: START 10/11/16 END 10/12/16
ELEV: 56.66'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0									
	S-9	-	5.0	100		SM	damp	Silty SAND (continued) - Clay seam 39.8 - 40.6 - Stratified orange and gray layers from 36.4 to 37.3	[non-sticky]
45.0	S-10	-	5.0	100			damp to moist	48.2	
50.0	S-11	-	5.0	100		SP SM	moist	Silty SAND, Poorly graded, homogeneous, coarse grained orange to gray. -50.0 - 51.6 clay seam with well graded gravel, subrounded to rounded.	
55.0	S-12	-	5.0	100			moist	-53.0 - 53.4 clay seam. - Becomes fine grained 60.0	
60.0	S-13	-	5.0	100		SM	moist	Silty SAND, uniformly graded little medium subrounded gravel 64.0 - Clay seam 62.0 - 64.0	
65.0	S-14	-	5.0	100		SP SM	moist	Silty SAND, Poorly graded, coarse grained, tan to gray. 69.5 - Clay seam 64.9 - 65.2	
70.0	S-15	-	5.0	100	4.0	CH	damp	Fat CLAY, homogeneous, gray hard. 75.0	[very sticky]
75.0								Boring Terminated at 75.0' See Next Page for Well Construction.	

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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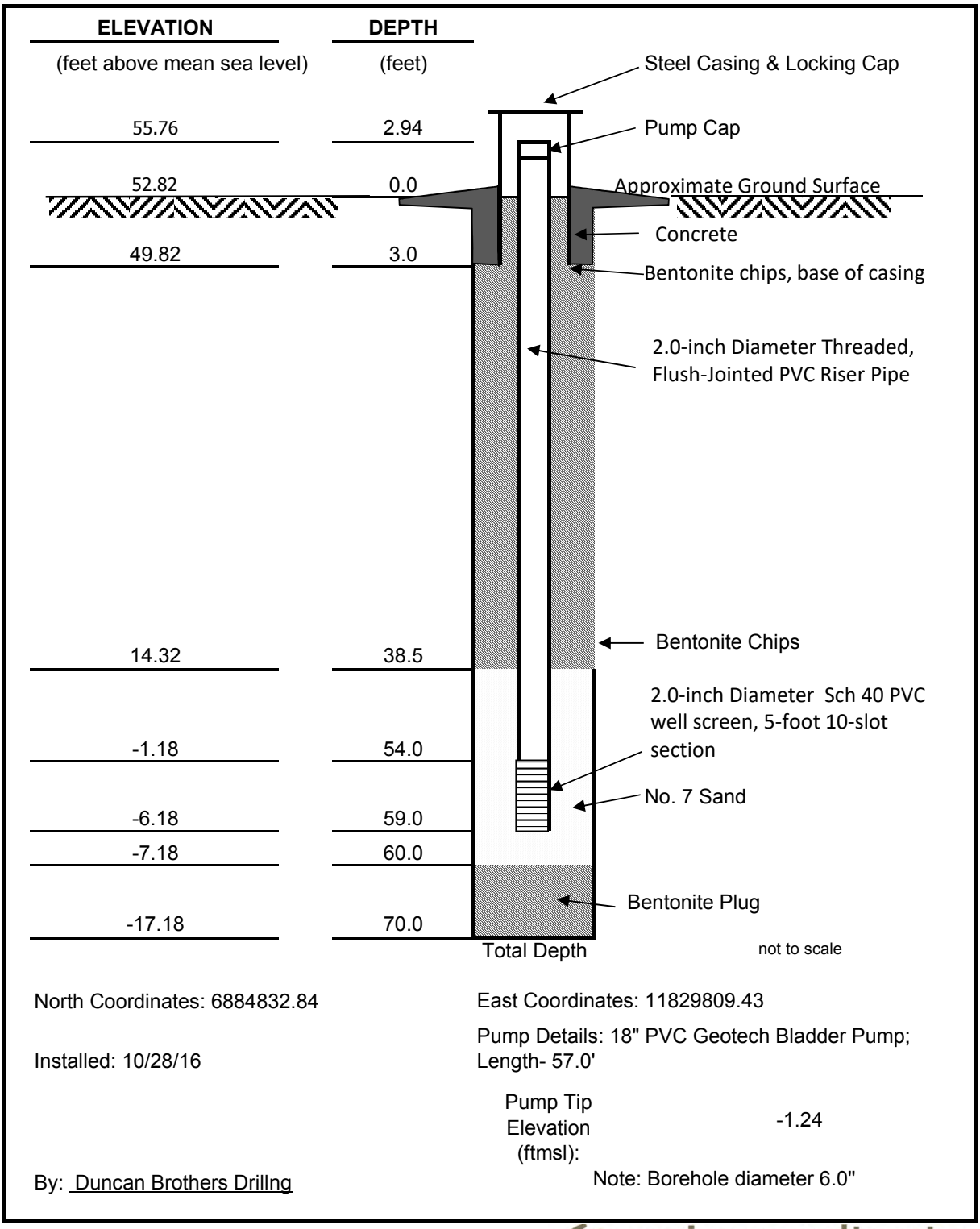
BORING NO. ED-1606
SHEET 3 OF 3
DATE: START 10/11/16 END 10/12/16
ELEV: 56.66'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
								* Well Construction - #7 Sand placed from 69.0 to 48.0'. Well set at 68.0' with 5' of SCH 40 2.0" well screen from 68.0 to 63.0'. Bentonite chip from 48.0' to 3.0' Chips were hydrated. Bentonite plug from 75.0' to 69.0', allowed to hydrate overnight	

Monitoring Well ED-1D
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6884832.84

East Coordinates: 11829809.43

Installed: 10/28/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 57.0'

Pump Tip Elevation (ftmsl): -1.24

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries VA
DRILLER NAME/COMPANY Ross / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC 09-041)
DRILLING METHODS: Sonic Drilling with 6" outer and 4" inner barrels 10'
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. ED-10
SHEET 1 OF 2
DATE: START 10/27 END 10/28
ELEV: 52.82'

Northing 6884832.84 Easting 11829809.43

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
0.0	S-1	-	2.0	40%	3.0	CL	moist	Silty Lean CLAY, little organics, little well graded rounded to subrounded gravel, trace fine sand, reddish-brown, very stiff to hard. [alluvium]	
								6.0'	
5.0	S-2	-	5.0	100%	74.5	SM	damp	Silty SAND, fine grained, trace medium subrounded to rounded gravel, light brown, blocky	
10.0	S-3	-	5.0	100%	3.0	SM	damp	-Interbedded 3" clay from 10.0-12.0' -Becomes tan and reddish brown	
15.0	S-4	-	5.0	100%	3.0	SM	damp	-Becomes medium to fine grained -Clay seam 16.6-17.0' -Becomes gray and orange	
20.0	S-5	-	5.0	100%	1.0 to 4.0	ML	Moist	SILT, some fine sand, tan, stiff to very stiff. -Well graded gravel zone from 20.0-21.2'	[non-sticky]
								24.6'	
25.0	S-6	-	5.0	100%		SM	Moist	Silty SAND, medium to coarse grained, tan to orange to gray. -Clay seam 28.5-29.4 with some sand	
30.0	S-7	-	5.0	100%		SP-SM	Moist	SAND, with silt, poorly graded, medium grained, trace medium rounded to subrounded gravel. orange to tan.	
								35.0'	
35.0	S-8	-	5.0	100%		SM	Moist	Silty SAND, medium grained trace subrounded to rounded medium gravel, tan to gray.	
40.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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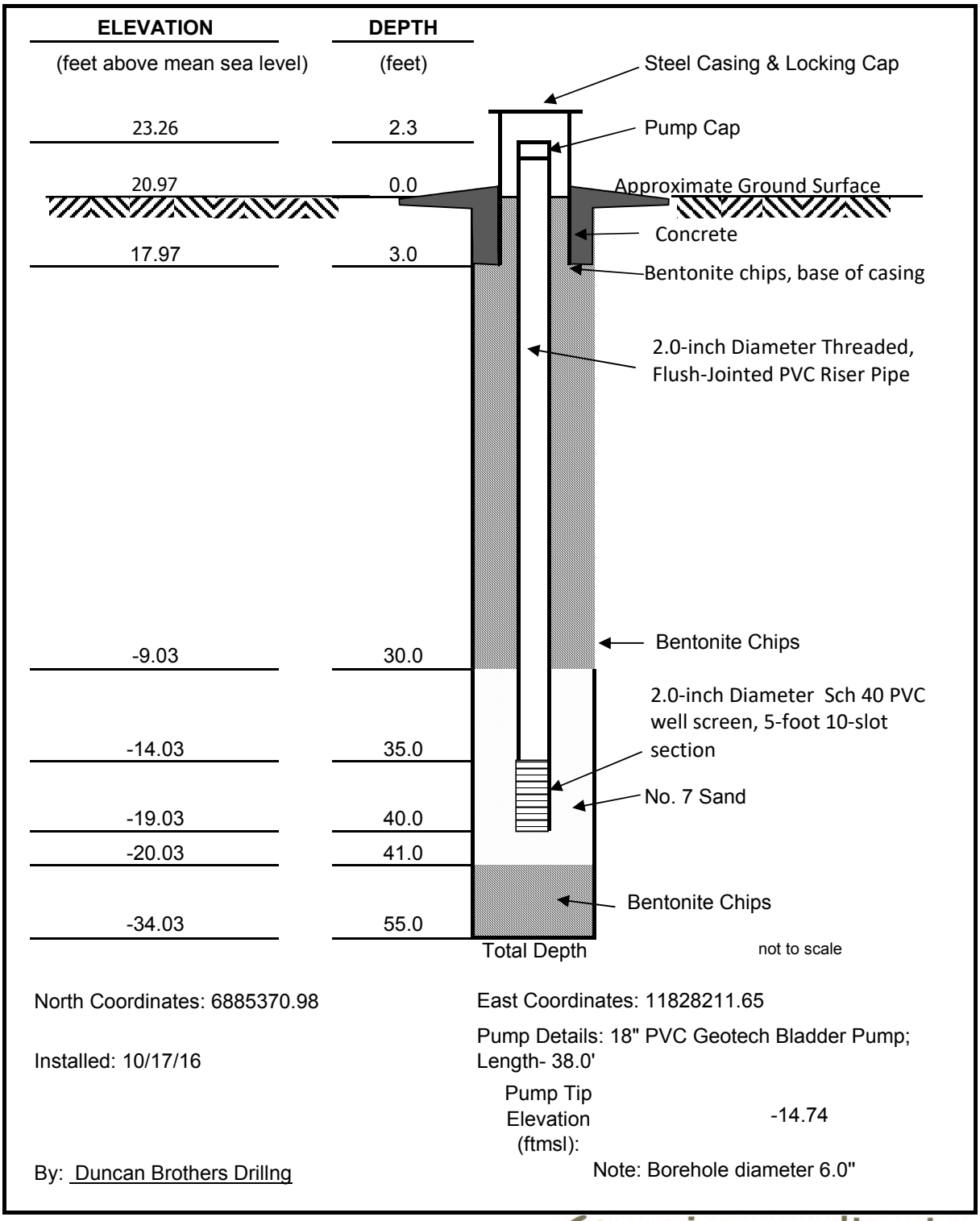
BORING NO. ED-1D
SHEET 2 OF 3
DATE: START 10/27 END 10/28
ELEV: 52.82'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0									
	S-9	–	5.0	100 %		SM	Moist	Silty SAND, (continued) -44.5 - 45.8 clay with some sand and medium subrounded to rounded gravel.	
45.0								45.8'	
	S-10	–	5.0	100 %		SC	Moist	Clayey SAND, medium grained Orange to tan	[moderately sticky]
50.0									
	S-11	–	5.0	100 %		SC	Moist	-53.3 - 55.1 clay seam	
55.0									
	S-12	–	5.0	100 %		SC	Moist to Wet	58.2'	
						SP SC		60.0' SAND, with clay, Poorly graded medium grained, gray to tan.	
60.0									
	S-13	–	5.0	100 %	74.5	CH	Moist to damp	Fat CLAY, homogeneous, gray hard.	[very sticky] [waxy appearance]
65.0									
	S-14	–	5.0	100 %	74.5	CH	damp	-Becomes mottled brown	
70.0								70.0'	
								Boring Terminated at 70.0' * Well Construction: #7 Sand Placed From 60.0 to 38.5' Well Set at 59.0' with 5' SCH 40 2.0" PVC. Well Screen from 59.0 to 54.0' Bentonite Chip 38.5 to 3.0' Bentonite Plug From 70.0 to 60.0' allowed to hydrate overnight.	

Monitoring Well ES-1609
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6885370.98

East Coordinates: 11828211.65

Installed: 10/17/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 38.0'

Pump Tip Elevation (ftmsl): -14.74

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Ross / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC 09-041)
DRILLING METHODS: Sonic Drilling with 6" outter 4" inner barrels 5' runs
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. ES-1609
SHEET 1 OF 2
DATE: START 10/16 END 10/17
ELEV: 20.97'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6885370.98 / Easting 11828211.65 REMARKS
0.0	S-1	–	4.0	80	2.0	cl	damp	2.3' Topsoil Lean CLAY, with some fine sand brown to gray, Stiff to Very Stiff. [alluvium]	
5.0	S-2	–	0.0	0			damp	- Sand lense from 3.2 to 3.5 fine grained orange to tan	
10.0	S-3	–	4.0	80		cl / sc	damp	12.0' Clayey SAND, fine grained Stratified to mottled gray and orange.	
15.0	S-4	–	5.0	100	0.25	sc / ml	damp	- lean Clay Seam from 16.0 - 17.3 Pocket Penetrometer 0.75 tsf 19.1' 20.0' SILT, with some fine sand, brown very soft.	
20.0	S-5	–	5.0	100	0.25	cl	damp	Lean CLAY, little fine Sand, homogeneous, gray. Soft to very Soft.	
25.0	S-6	–	5.0	100	1.0	cl	damp	- from 29.0 to 31.7 orange iron stained well graded subrounded to rounded gravel with some coarse Sand	
30.0	S-7	–	5.0	100		gc-gw / sc	moist to wet	31.7 33.0' Clayey GRAVEL, well graded with some coarse sand.	
35.0	S-8	–	5.0	100		sc	moist to damp	Clayey SAND, fine grained, homogeneous, gray	
40.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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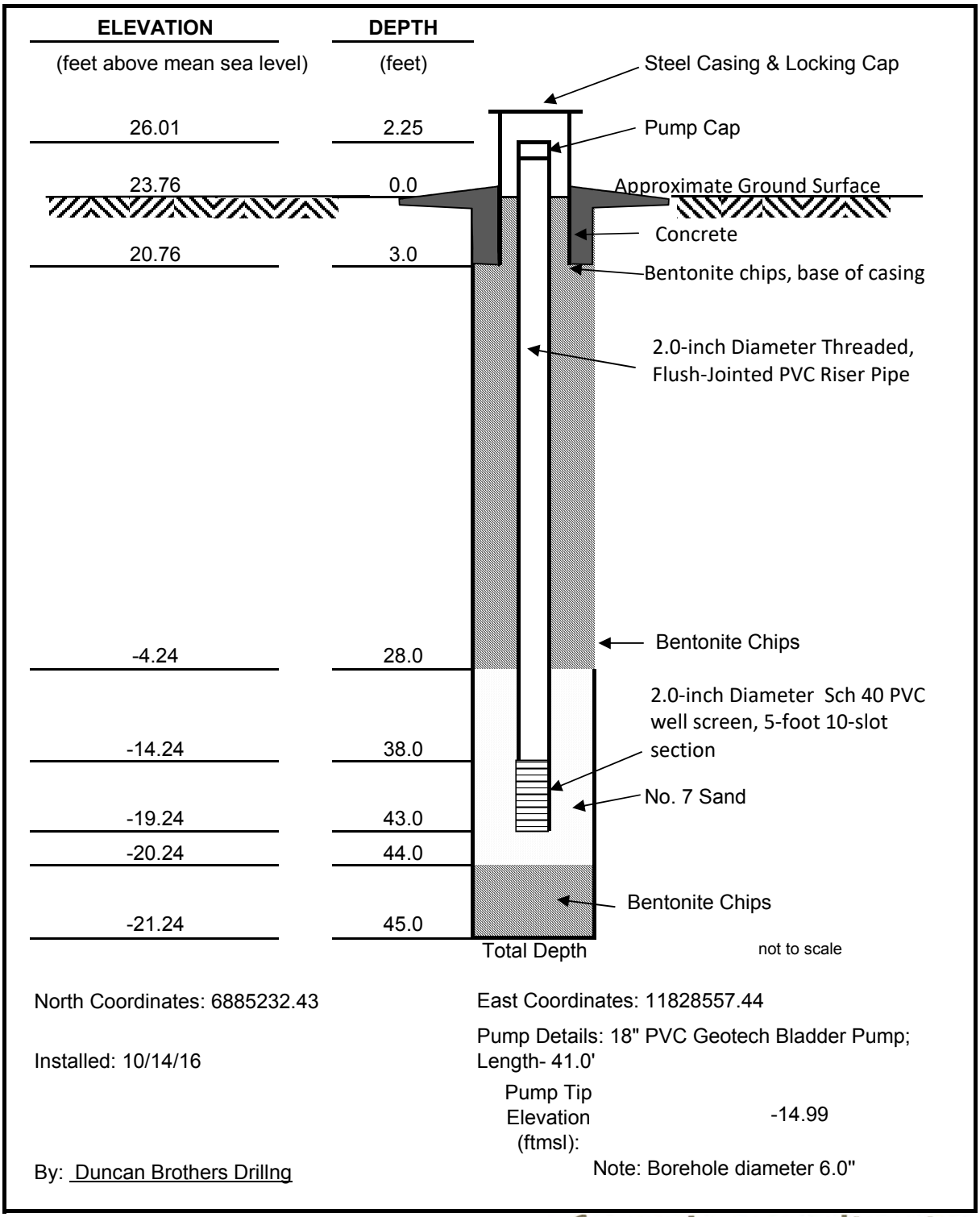
BORING NO. ES-1609
SHEET 2 OF 2
DATE: START 10/16 END 10/17
ELEV: 20.97'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0									
	S-9	-	5.0	100		SC	damp	Clayey SAND, (continued)	
45.0									
	S-10	-	5.0	100		SC	moist to damp	-Well graded gravel subrounded to rounded from 47.2 to 47.7	
50.0									
	S-11	-	5.0	100		SC	damp		
55.0								55.0'	
								Boring Terminated at 55.0' *Well Construction: #7 Sand Placed from 41.0 to 30.0'. Well set at 40.0' with 5' SCH40 2.0' well screen from 40.0 to 35.0' Bentonite chip 55.0 to 41.0' allowed to hydrate and swell for 2.0 hrs. Bentonite chip seal from 30.0 to 3.0' * Shallow well was to be installed if upper sand formation contained a water bearing zone. Drillers pushed casing down to 19.0' and pulled up one foot to find no water bearing zone. Therefore, the drillers continued to sample to the lower sand formation.	

Monitoring Well ES-1613
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6885232.43

East Coordinates: 11828557.44

Installed: 10/14/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 41.0'

Pump Tip Elevation (ftmsl): -14.99

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Cass / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC 09-041)
DRILLING METHODS: Sonic Drilling with 6" outer and 4" inner barrel and 5' runs
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. ES-1613
SHEET 1 OF 2
DATE: START 10/13/16 END 10/14/16
ELEV: 23.76'

Northing	Easting
6885232.43	11828557.44

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
0.0								0.7' Topsoil	
	S-1	-	5.0	100	2.5	CL	moist	Lean CLAY, trace organics orange brown, stiff to very stiff. [alluvium]	
								4.2'	
5.0	S-2	-	0.0	0		SC	moist	Clayey SAND, fine grained tan to orange.	
10.0	S-3	-	3.0	60			damp to dry	- Becomes medium grained sand	
								13.3'	
15.0	S-4	-	3.0	60		SP	damp	SAND, Poorly graded fine grained, tan to white.	
20.0	S-5	-	2.0	40	0.5	CL	moist	23.0'	
								Lean CLAY, gray to orange, soft,	
25.0	S-6	-	4.5	90	0.5	SP	moist	SAND, Poorly graded fine grained tan to white.	
						ML		25.6' 26.0' SILT, gray soft	
						SM		26.5' Silty SAND. fine grained, gray	
30.0					1.0	CL		27.4' Lean CLAY, tan some fine sand stiff	
	S-7	-	4.0	80		SM	damp	Silty SAND, fine grained tan to orange.	
35.0								34.0'	
	S-8	-	5.0	100		SC	damp	Clayey SAND, fine grained gray - 34.0-35.4 well graded gravel subrounded to rounded.	
40.0									

BORING LOG

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PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

BORING NO. B-1613
SHEET 2 OF 2
DATE: START 10/13/11 END 10/14/11
ELEV: 23.76'

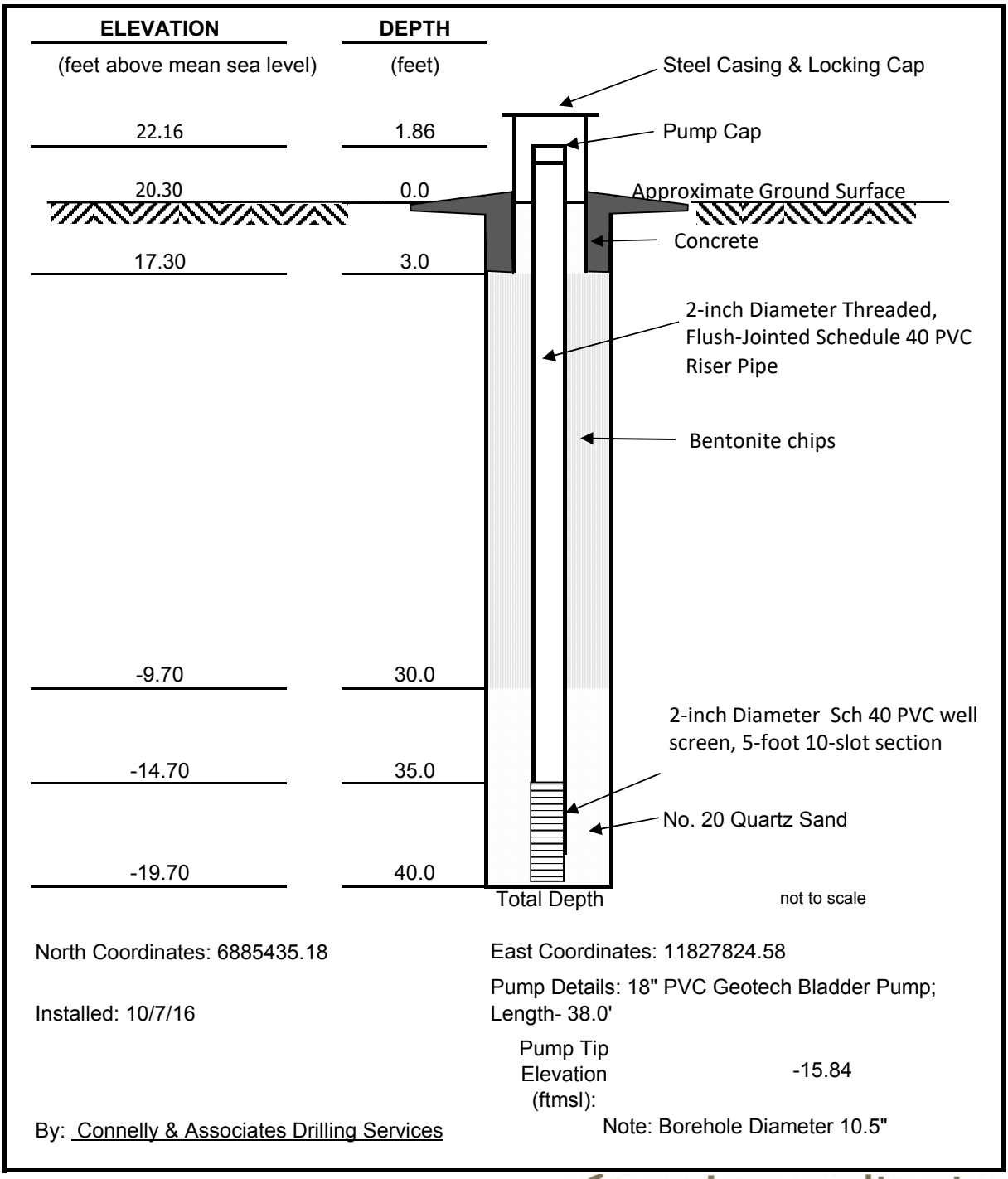
DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0			5.0	100		SC		Clayey SAND (continued)	
	S-9	-					damp	43.7'	
					7+5	ch		Fat CLAY, dark gray little dark brown mottling, hard	
45.0								Boring terminated at 45.0'	

Bentonite plug from 45' to 44'

*Well Construction:
#7 Sand placed from 44' to 28'. Well set at 43' with 5' of SCH 40 2.0" well screen from 43 to 38'. Bentonite Chip From 28 to 3.0'

* Shallow well was to be installed & upper sand formation contained a water bearing zone. Drillers Pushed casing down to 23' pulled up one foot to find no water bearing zone in upper end. The boring was terminated and abandoned using bentonite chips.

ES-3D
Possum Point Power Station
Dominion Transmission, Inc.
Record Detail



North Coordinates: 6885435.18

East Coordinates: 11827824.58

Installed: 10/7/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 38.0'

Pump Tip Elevation (ftmsl): -15.84

By: Connelly & Associates Drilling Services

Note: Borehole Diameter 10.5"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Nathan / Connelly Drilling
EQUIPMENT USED: Diedrich D-50 Turbo Twin autohammer
DRILLING METHODS: 6" HSA in Conjunction with SPT 2' Sampling
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PM / JMS REVIEWED BY: _____ DATE: _____

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BORING NO. ES-3D
SHEET 1 OF 3
DATE: START 9/26/16 END 10/7/16
ELEV: 20.3'

Northing	Easting
6885435.18	11827824.58

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS offset boring 15' due East from ES-3A
0.0									topsoil 0.0-0.5'
	S-1	4 6 6 7	1.6'		>4.5	CL	dry	Lean CLAY, orange brown to light brown, some organics trace Sand, fine grained, Hard, homogeneous. [Fill]	[dusty when dry]
2.0									
2.5	S-2	4 7 8 11	2.0'		3.5	CH	dry	Fat CLAY, mottled gray and orange, trace organics, very stiff. [Alluvial]	[Little powder when dry]
4.5									
5.0	S-3	4 5 5 9	2.0'		3.5	CH	dry to damp	- Becomes predominantly gray	[waxy apperance]
7.0									
7.5	S-4	8 10 12 18	2.0'		3.0	CH	damp	- Little sand, fine grained, dark gray to light gray.	
9.5									
10.0	S-5	6 5 5 6	1.8'		2.75	CH	damp	- Becomes predominantly dark gray	
12.0									
12.5	S-6	10 12 16 16	2.0'		0.5	CH	damp to moist	- Becomes soft - thin clayey sand layer from 13.7' to 13.9'	[thread test < 1/16"]
14.5									
15.0	S-7	3 6 6 8	1.0	-	-	SC	MOIST	CLAYEY SAND, ORANGE TO GRAYISH BROWN	
17.0									
17.5	S-8	4 4 7 9	2.0	-	2.5	CL	MOIST	17.5 SANDY CLAY, GRAYISH BROWN	
19.0					-	SC		19.0 CLAYEY SAND, LIGHT GRAYISH TAN	
19.5									

BORING LOG

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PROJECT NO. 0150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY CHRIS - CONNELLY / JEREMY - CONNELLY
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2" SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: RM / JMS REVIEWED BY: _____ DATE: _____

BORING NO. ES-3D
SHEET 2 OF 3
DATE: START 9/26/16 END 10/7/16
ELEV: 20.3'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20.0		4			3.5	CL	MOIST	SILTY CLAY, GRAYISH BROWN	
	S-9	4	2.0	—			TO		
		4			—	SC	WET	CLAYEY FINE SAND, LIGHT GRAYISH BROWN	
22.0		5			—	SP		MEDIUM SAND, LIGHT GRAY	
22.5									
		4			1.0			SANDY CLAY, LIGHT GRAYISH TAN	
	S-10	5	2.0	—	—	CL	M	TO BROWNISH GRAY	
		7			3.0				
24.5		6							
25.0								25.0	
		4				SC	M	CLAYEY SAND, LIGHT GRAYISH TAN	
	S-11	5	2.0	—	2.0		TO	26.0	
		6				CH	W	FAT CLAY, LITTLE SAND, GRAYISH	
27.0		11						TAN	
27.5								27.5	
		7						DENSE CLAY, LITTLE SAND	
	S-12	7	2.0	—	4.0	CL	M	DARK ORANGEISH / REDDISH BROWN	
		8							
29.5		9							
30.0								30.0	
		4					M	FINE - MEDIUM SAND, TRACE CLAY	HEAVY FE
	S-13	4	1.0	—	—	SP	TO	DARK ORANGEISH RED / BROWN	STAINING
		7					W		WET SPOON
32.0		10							
32.5								32.5	
		2			3.5	CL	M	FAT CLAY, DARK GRAY, MICACEOUS	
	S-14	1	1.0	—					
		3			—	GP	SAT	COARSE GRAVEL TO COBBLES, SOME	
34.5		7						MEDIUM SAND, TAN TO ORANGE	
35.0									
		16							
	S-15	33	1.0	—	2.5	CL	SAT	(CLAY & COBBLES CONTINUED	
		21				/GL		MAY BE JUNK IN SPOON)	
37.0		11							
		10						COBBLE FRAGS, MAY BE GREATER THAN 2"	
	S-16	14	0.7	—	—	GP	SAT		
		21							
39.0		31							
	S-17	14	0.2	—	—	GP	SAT		
40.0		8							

END 40.0'

BORING LOG

PROJECT NO. C150132.00
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES VA
DRILLER NAME/COMPANY CHRIS-CONNELLY DRILLING
EQUIPMENT USED: DIEDRICH D-50 TURBO TRACK
DRILLING METHODS: 6" HSA, 2' SPT AUTO
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: JMS REVIEWED BY: _____ DATE: _____

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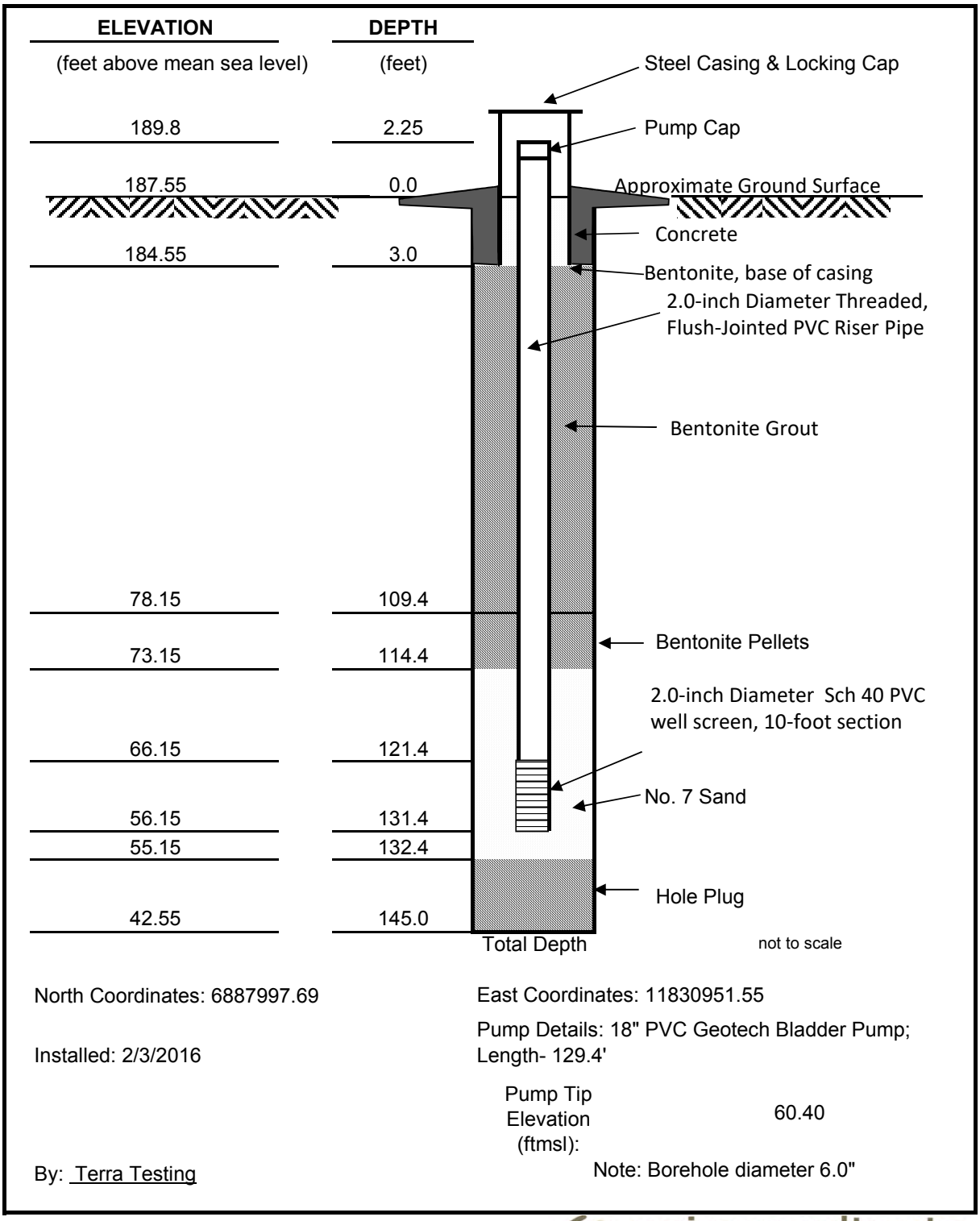
BORING NO. ES-3D
SHEET 3 OF 3
DATE: START 9/26/11 END 10/7/11
ELEV: 20.3'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
								MONITORING WELL INSTALLATION NOTES 5' SCHEDULE 40 PVC, 10-SLOT SCREEN FROM 40'-35'* #20 SAND FROM 40'-30' BENTONITE CHIP SEAL 30'-3' STEEL PROTECTIVE CASING WITH LOCKING CAP CONCRETED IN PLACE. 2x2' CONCRETE PAD INSTALLED AROUND STEEL CASING. FOUR BOLLARDS INSTALLED AROUND CONCRETE PAD. WELL DEVELOPED ON 10/10. * SCHEDULE 40 PVC RISER FROM 35' - SURFACE WITH 3' STICKUP.	

ED-1612

Monitoring Well MW-1612
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6887997.69

East Coordinates: 11830951.55

Installed: 2/3/2016

Pump Details: 18" PVC Geotech Bladder Pump; Length- 129.4'

Pump Tip Elevation (ftmsl): 60.40

By: Terra Testing

Note: Borehole diameter 6.0"

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ED-1612

PROJECT Possum Point Power Station - Pond Closures — BORING NO. MW-1612 (P-1)

ELEVATION 187.55' GWL 0 HRS 2/1/16 11:00 AM ELEV: 71.71 — PROJECT NO. C150132.05

HRS 2/3/16 1:30 PM ELEV. 81.55

DATE 2/3/16 — CLASSIFIED BY E. HOLLAR — PAGE 1 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	Northing 6887997.69 / Easting 11830951.55 — REMARKS* WELL INSTALLATION
1	2	3	4	5	6	7	8	9	10
							REDDISH/BROWN SILTY CLAY W/ TRACE TO LITTLE SAND & GRAVEL (CL)		GRND ELEV. 187.55'
									Top of Pump Cap El. 189.8'
10		6-10(4')							Grout to 3.0 ft.
							12.0'		
							REDDISH/BROWN FINE SILTY SAND (DRY) (SM)		
20		18-20(2')							
							TAN FINE SILTY SAND (DRY) (SM)		Grout
30		18-20(2')							
							TAN/BRN FINE TO MEDIUM SITY SAND (MOIST) (SM)		2" PVC
40		35-45(5')							BENTONITE
							BROWN/GRAY FINE TO MEDIUM SILTY SAND (MOIST) (SM)		
50		44-50(6')							
							BROWN/WHITE FINE TO MEDIUM SILTY SAND (SM)		
60		55-60(5')							

REMARKS ** START 1/29/16 11:30AM. DRILLING COMPLETE 1/31/16 10:30 AM. WELL INSTALLATION COMPLETE, INCL. PROTECTIVE COVER ON 2/1/16

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. MW-1612

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ED-1612

PROJECT Possum Point Power Station - Pond Closures BORING NO. MW-1612(P-1)

ELEVATION _____ GWL 0 HRS _____ PROJECT NO. C150132.00

HRS _____

DATE 2/3/16 CLASSIFIED BY _____ PAGE 2 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
							WHITE-BROWN FINE MEDIUM SILTY SAND TR. GRAVEL (SM		
70		68-70(8')							
							WHITE-BROWN FINE TO MEDIUM SILTY SAND W/ TR GRAVEL (SM)		
80		71-80(9')							
		10'					WHITE-BROWN FINE TO COARSE SILTY SAND TRACE TO LITTLE GRAVEL (MOIST) (SP) 92'		2" PVC Grout Bentonite
90									
		8'					GREEN CLAYEY SILT W/ SAND PARTINGS (MOIST) (CL-ML)		
		92-100							
100									
							GREEN CLAYEY SILT WITH SAND PARTINGS (MOIST) (CL-ML)		
		10'							
110									109.4
							112.0'		Bentonite Pellets 114.4
							BROWN-GRAY FINE TO MED TRACE GRAVEL (MOIST) (SM)		
		10'							Sand
120									

REMARKS ** _____

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. MW-1612

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ED-1612

PROJECT Possum Point Power Station - Pond Closures BORING NO. MW-1612(P-1)

ELEVATION _____ GWL 0 HRS _____ PROJECT NO. C150132.00

HRS _____

DATE 2/3/16 CLASSIFIED BY _____ PAGE 3 of 3

DEPTH (FT.)	BLOWS PER SIX INCHES OR CORE RECOVERY/RUN	SAMPLE NO., TYPE & RECOVERY OR % ROCK RECOVERY	RQD (%) OR TORVANE	DESCRIPTION: PROFILE	DESCRIPTION: SOIL DENSITY - CONSISTENCY OR ROCK HARDNESS	DESCRIPTION: COLOR	DESCRIPTION: MATERIAL CLASSIFICATION	USCS OR ROCK BROKENNESS	REMARKS*
1	2	3	4	5	6	7	8	9	10
									121.4'
		10'					GRAY-BROWN FINE TO COARSE SILTY SAND TRACE TO LITTLE SANDY GRAVEL (MOIST-WET)		10' SCREEN 10' SAND
130							SM-SP 132.0'		131.4'
									132.4 (EL 56.0)
		10'					GRAY SILTY CLAY TRACE GRAVEL (CL)		HOLE PLUG
140									
		5'					GRAY SILTY CLAY TRACE GRAVEL (CL)		
145							145.0'		
							EOB		

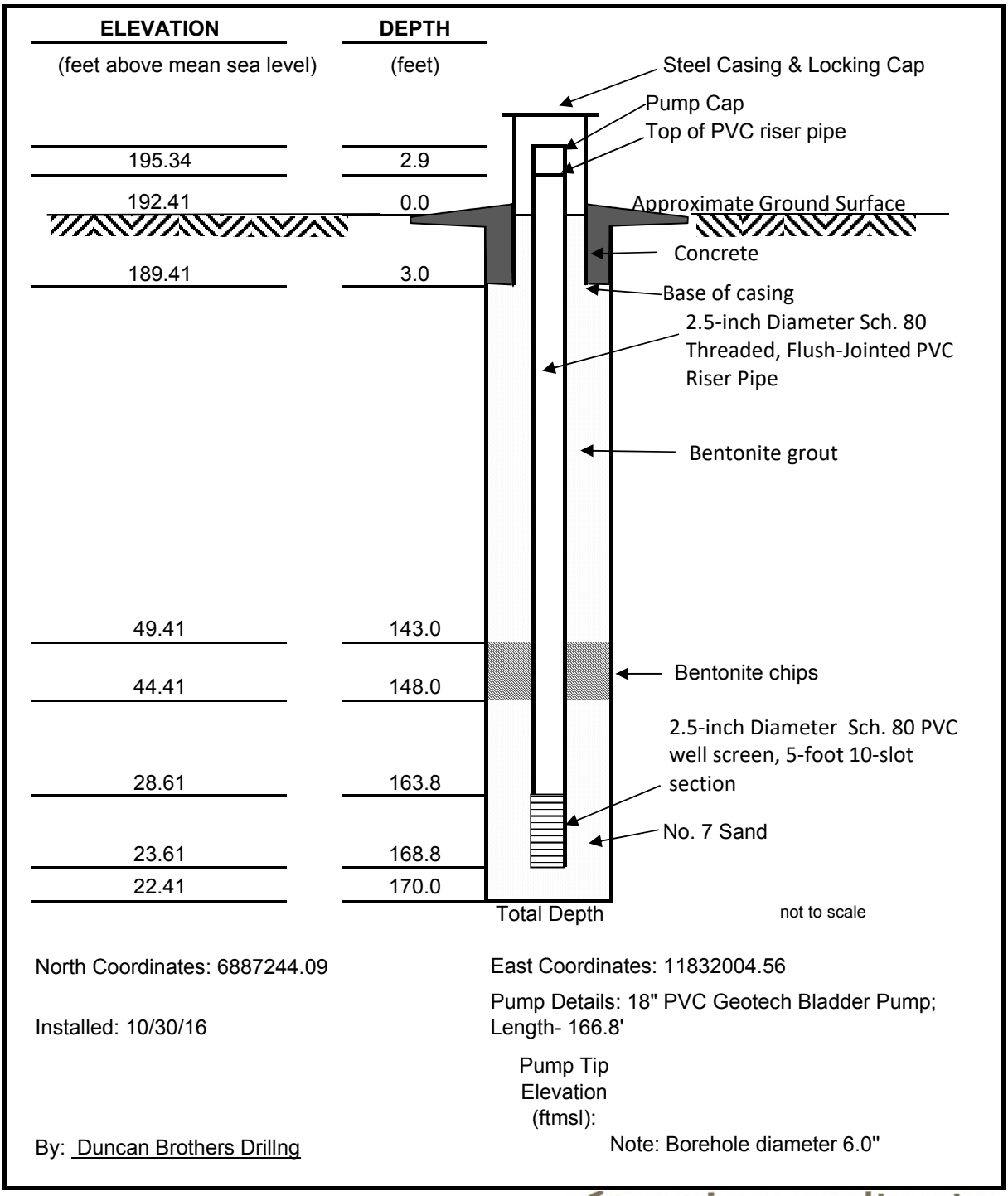
REMARKS ** WELL SET @ APPROX. 131.4

* POCKET PENETROMETER READINGS

** METHOD OF ADVANCING AND CLEANING BORING

BORING NO. MW-1612

Monitoring Well SD-1603
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6887244.09

East Coordinates: 11832004.56

Installed: 10/30/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 166.8'

Pump Tip Elevation (ftmsl):

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries VA
DRILLER NAME/COMPANY Ross / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC09-041)
DRILLING METHODS: Sonic Drilling with 6" outer 4" inner barrels 10' runs
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1603
SHEET 1 OF 5
DATE: START 10/29 END 10/30
ELEV: 192.41'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6887244.09 / Easting 11832004.56 REMARKS
0.0									
	S-1	-	9.0	100	0.5	CL	damp to moist	Lean CLAY, blocky, some subangular gravel medium, Brown [fill]	
					2.5			3.6' Lean CLAY, trace fine grained sand, trace organics, dark brown to orange, medium [alluvium]	
					3.0			-Burnt organics and ash 4.8 to 5.3'	
10.0									
	S-2	-	7.0	70	3.5	CL	damp	-Becomes very stiff -9.2 to 9.6 well graded subrounded gravel zone. -Becomes blocky and orange-red.	
20.0								20.0'	
	S-3	-	8.4	84		SM	damp to moist	Silty SAND, fine grained, tan to yellow brown	[non-sticky]
30.0									
	S-4	-	6.7	67		SM	moist	-Becomes gray and red	
40.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1603
SHEET 2 OF 5
DATE: START 10/29 END 10/30
ELEV: 192.41'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0			8.0	80				Silty SAND, (continued)	
	S-5	–				SM	moist		
50.0			7.0	70					
	S-6	–				SM	moist		
60.0								60.0'	
			10.0	100				Fat CLAY, gray mottled brown, hard	
	S-7	–			74.5	CH	damp		
								- 70.0 to 70.5 Clayey sand seam.	
70.0								70.5'	
			10.0	100				SAND, with some silt, Poorly graded medium sand, tan to light gray.	
	S-8	–				SP SM	damp		
80.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-16.03
SHEET 3 OF 5
DATE: START 10/29 END 10/30
ELEV: 192.41'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
80.0									
			10.0	100		SP SM	damp	SAND, (continued) -Becomes orange to tan	
	S-9	-						-Becomes tan to light gray	
90.0								90.0'	
			10.0	100	74.5	ML		SILT, gray, hard, homogeneous 93.0'	
	S-10	-				SP SM	damp	SAND, with some silt, Poorly graded medium sand, tan to light gray. 100.0'	
100.0									
			10.0	100		SM	moist to wet	Silty SAND, trace well graded subrounded to rounded gravel medium grained sand, tan to orange. 105.8'	
	S-11	-				GW GC		GRAVEL, some clay, well graded subrounded to rounded, medium 109.2 to Coarse Sand, light Brown.	
110.0						SC		Clayey SAND, medium grained, orange brown. 110.0'	
			10.0	100		CH	moist	Fat CLAY, homogeneous, gray with trace to little orange brown mottling, hard.	
	S-12	-			74.5				
120.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1603
SHEET 4 OF 5
DATE: START 10/29 END 10/30
ELEV: 192.25'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
120.0									
	S-13	–	10.0	100	4.0	CH	moist to damp	Fat CLAY, (continued)	
130.0	S-14	–	10.0	100	3.5	CH	damp		
140.0	S-15	–	10.0	100	24.5	SP SC	moist	141.4' SAND, and clay; Poorly graded, medium grained, gray to light brown. 150.0'	
150.0	S-16	–	10.0	100		SC	moist to wet	Clayey SAND, medium grained trace subrounded to rounded gravel, tan.	
160.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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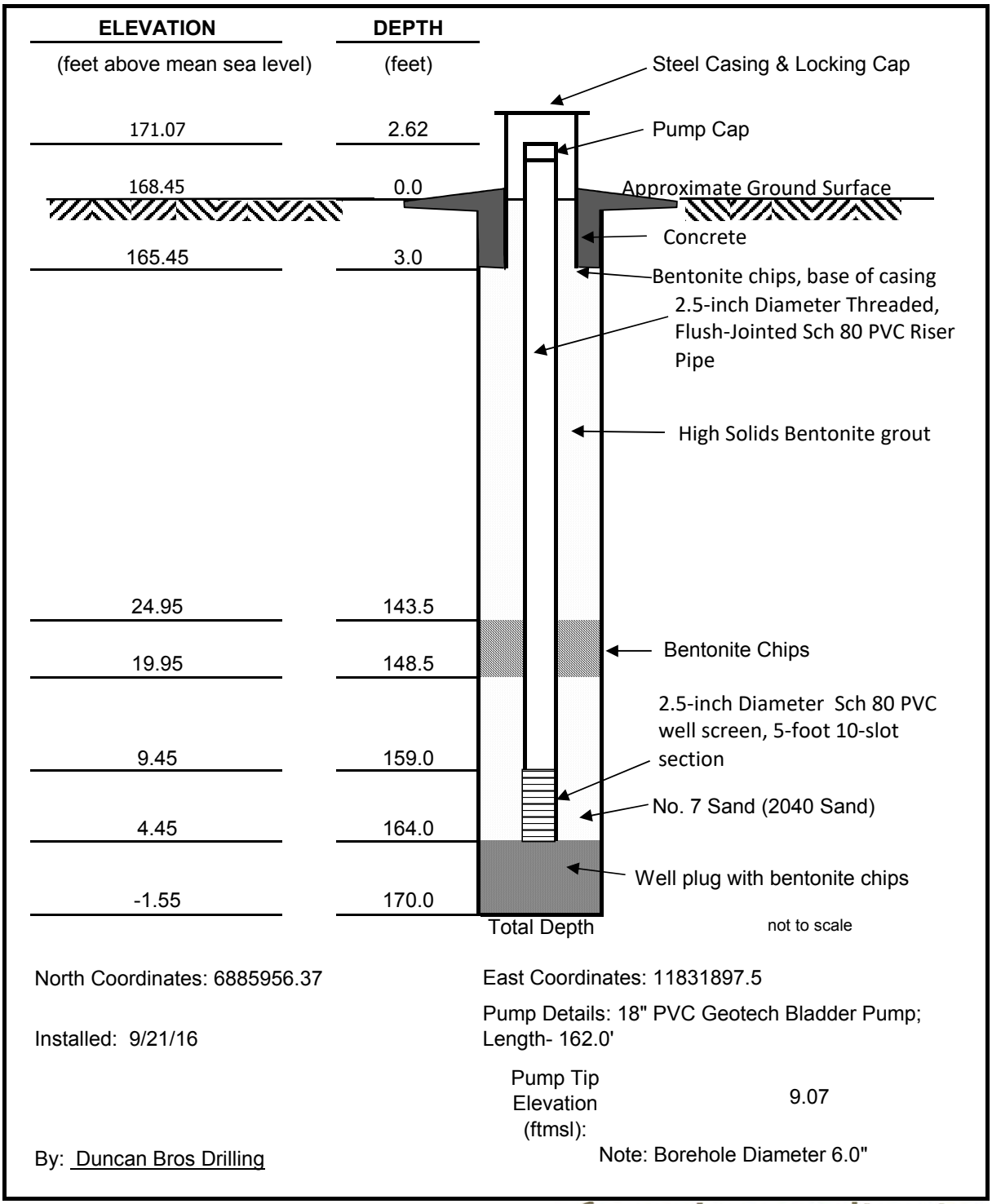
BORING NO. SD-1603
SHEET 5 OF 5
DATE: START 10/29 END 10/30
ELEV: 192.41'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
160.0									
	S-17	-	10.0	100		SC	moist to wet	Clayey SAND, (continued) -163.0-165.3 becomes fine grained and gray -165.3-168.8 becomes medium grained	
170.0					74.5	CH		Fat CLAY, homogeneous, gray, hard 170.0	
								Boring Terminated at 170.0' * Well Construction: #7 Sand placed from 170.0 to 148.0. Well set at 168.8 with 5.0' of SCH80 2.5" well Screen from 168.8 to 163.8. Bentonite chip plug from 148.0 to 143.0. Bentonite chips allowed to hydrate Overnight. Pumped grout the following day to 3.0'	

Monitoring Well SD-1604
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6885956.37

East Coordinates: 11831897.5

Installed: 9/21/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 162.0'

Pump Tip Elevation (ftmsl): 9.07

By: Duncan Bros Drilling

Note: Borehole Diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00.071
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Ross Knotts / Duncan Bros Drilling
EQUIPMENT USED: 2006 Sonic SD-450 Track Rig
DRILLING METHODS: Sonic w/ 6" outer and 4" inner barrels in 10' runs
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 29.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: Gene Cooney REVIEWED BY: DATE:

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BORING NO. SD-1604
SHEET 1 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	Northing 6885956.37 / Easting 11831897.5 REMARKS
0.0								TOPSOIL (2")	
			0	0	—	—	—	NO RECOVERY 3.00	2" - 3' NO RECOVERY
			2.0	40 %	—	GW	DRY	SANDY GRAVEL W/ FINE TO COARSE SAND, GRAY 4.00	
5.0					—	SM	MOIST	FINE TO COARSE SILTY SAND W/ FINE GRAVEL, REDDISH ORANGE	
			5.0	100 %				7.00	
					—	SP	MOIST	MEDIUM TO COARSE GRAVELLY SAND, REDDISH ORANGE 8.50	
10.0					—	SM	MOIST	FINE TO COARSE SILTY SAND, LITTLE FINE GRAVEL, REDDISH ORANGE	VERY WELL ROUNDED GRAVEL
			5.0	100 %					
15.0									
			5.0	100 %					
20.0								20.00	

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 29.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 2 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
20.0					—	CL	MOIST	SANDY CLAY, SOME FINE GRAVEL, REDDISH ORANGE 21.00	☆ HARDER MATERIAL ENCOUNTERED ON 20-30' RUN - START USING OUTER CASING AND WATER
			5.0	100%	—	SP	MOIST	FINE TO MEDIUM SAND, LITTLE SILT, LIGHT BROWN / TAN	
25.0			5.0	100%					
30.0			5.0	100%	—	SP	MOIST	GRAVELLY SAND (MEDIUM TO COARSE SAND), LIGHT BROWN 32.00	
35.0					—	ML	MOIST	SILT, TRACE GRAVEL, DARK GRAY 37.00 37.50	
					—	SP	MOIST	FINE TO COARSE SAND, SOME CLAY LENSES AND FINE GRAVEL, TAN / LIGHT BROWN	
40.0									

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSEUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROCK KNOTTS / DUNCAN ROOS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER CASING IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 29.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 3 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0					—	SP	MOIST	(CONTINUED) FINE TO COARSE SAND, SOME CLAY LENSES AND FINE GRAVEL, TAN/LIGHT BROWN 42.00	
			5.0	100%	—	SC	MOIST	MEDIUM TO COARSE CLAYEY SAND, LITTLE FINE GRAVEL, ORANGE/GRAY 44.00	
45.0					3.0	CL	MOIST	SANDY CLAY (FINE TO MEDIUM SAND), TRACE GRAVEL, LIGHT GRAY 47.00	
			5.0	100%	—	SP	MOIST	FINE TO MEDIUM SAND, TRACE SILT AND VERY FINE GRAVEL, TAN/LIGHT GRAY 51.00	
50.0									
			5.0	100%	—	SP	MOIST	FINE TO MEDIUM SAND, SOME FINE GRAVEL, ORANGE	
55.0									
			5.0	100%	—	SP	MOIST		
60.0								60.00	

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 129.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 4 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
60.0								SANDY FAT CLAY, LIGHT BROWN	
			5.0	100%	3.75	CH	MOIST		
65.0								67.00	
			5.0	100 %	—	SP	MOIST	FINE TO COARSE SAND, LIGHT GRAY / ORANGE	
70.0								73.00	▼ WATER AT 73'
			5.0	100 %	—	SM	WET	MEDIUM TO COARSE SILTY SAND, SOME GRAVEL, LIGHT BROWN / GRAY	
75.0			5.0	100 %				78.00	
					—	SP	WET	MEDIUM TO COARSE GRAVELLY SAND, LIGHT BROWN / GRAY	
80.0									

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN ADDS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 129.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COOMEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 5 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
80.0								(CONTINUED) MEDIUM TO COARSE GRAVELLY SAND, LIGHT BROWN/GRAY	
			5.0	100%	—	SP	WET		
85.0									
			5.0	100%				87.50	
					3.25	CL	MOIST	SANDY CLAY (FINE TO MEDIUM SAND) SOME FINE GRAVEL, LIGHT BROWN/ORANGE 89.00	
90.0					—	SP	MOIST	MEDIUM TO COARSE SAND, TRACE OF FINE GRAVEL GRAVEL, LIGHT BROWN/ORANGE	
			5.0	100%	—	SM	MOIST	92.00 MEDIUM TO COARSE SILTY SAND, SOME FINE GRAVEL, LIGHT BROWN/TAN	
								94.00	
95.0								SANDY FAT CLAY, LIGHT BROWN/ORANGE	
			5.0	100%	3.5	CH	DAY		
100.0									

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROCK KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 6 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
100.0					3.5	CH	DAY	(CONTINUED) SANDY FAT CLAY, LIGHT BROWN/ORANGE 101.00	
								SANDY CLAY (FINE TO MEDIUM SAND), LIGHT GRAY/GREEN	
			5.0	100%	2.5	CL	MOIST	104.00	
105.0								FINE TO COARSE CLAYEY SAND, LIGHT GRAY/GREEN	
			5.0	100%	—	SC	MOIST	110.00	
110.0								SANDY CLAY (FINE TO MEDIUM SAND), LITTLE FINE GRAVEL, LIGHT BROWN	
			5.0	100%	1.75	CL	MOIST		
115.0			5.0	100%				118.00	
					1.50	CH	DRY	FAT CLAY, LIGHT BROWN/GREEN	
120.0									

BORING LOG

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PROJECT NO. C150132.00,071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SN-4510 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 129.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 7 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
120.0								(CONTINUED)	
					1.50	CH	DRY	FAT CLAY, LIGHT BROWN/GREEN	
								122.00	
			5.0	100 %	1.50	CL	MOIST	SANDY CLAY (FINE TO MEDIUM SAND), LIGHT BROWN/GREEN	
125.0									
								126.50	
			5.0	100 %	3.75	CH	DRY	SANDY FAT CLAY, LIGHT BROWN/GREEN	
130.0								130.00	
								FINE TO COARSE SAND, LIGHT GRAY/GREEN	
			5.0	100 %	—	SP	MOIST		
135.0									
			5.0	100 %					
140.0									

BORING LOG

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PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC W/ 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 139.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

BORING NO. SD-1604
SHEET 8 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
140.0								(CONTINUED) FINE TO COARSE SAND, LIGHT GRAY / GREEN	
			5.0	100 %	—	SP	MOIST		
145.0									
			5.0	100 %	—	SP	MOIST	LITTLE FINE GRAVEL, TRACE CLAY	
150.0									
			5.0	100 %	—	SP	MOIST	154.00 ★ WATER AT 154'	
								MEDIUM TO COARSE CLAYEY SAND, LIGHT GRAY / GREEN	
155.0			5.0	100 %	—	SC	WET		
160.0									

BORING LOG

PROJECT NO. C150132.00.071
PROJECT NAME POSSUM POINT
PROJECT LOCATION DUMFRIES, VA
DRILLER NAME/COMPANY ROSS KNOTTS / DUNCAN BROS DRILLING
EQUIPMENT USED: 2006 SONIC SD-450 TRACK RIG
DRILLING METHODS: SONIC 6" OUTER AND 4" INNER BARRELS IN 10' RUNS
PRE CORE WATER DEPTH N/A DATE/TIME
0 HR WATER DEPTH (POST CORE) 34' DATE/TIME 9/20/16 15:00
24 HR WATER DEPTH 129.50' DATE/TIME 9/21/16 14:30
HR WATER DEPTH DATE/TIME
CLASSIFIED BY: GENE COONEY REVIEWED BY: DATE:

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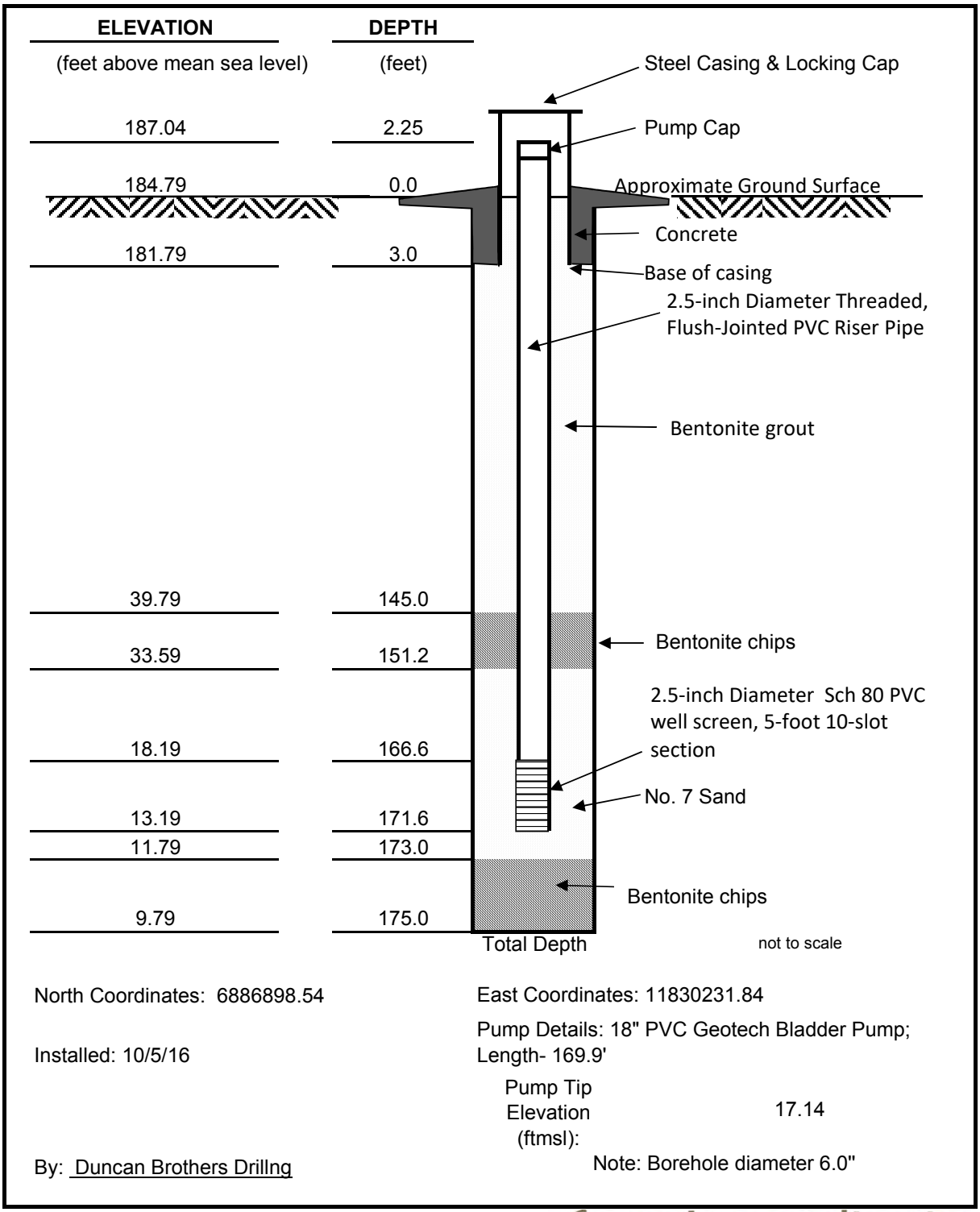
BORING NO. SD-1604
SHEET 9 OF 9
DATE: START 9/16/16 END 9/21/16
ELEV: 168.45

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
160.0								(CONTINUED)	
			5.0	100 %	—	SC	WET	MEDIUM TO COARSE CLAYEY SAND, LIGHT GRAY / GREEN	
								164.00	
165.0			5.0	100%	3.75	CH	DRY	FAT CLAY, DARK GRAY	START OF E LAYER
								BORING TERMINATED 170.00	
170.0								* WELL CONSTRUCTION — BOTTOM OF HOLE PLUGGED FROM 170' TO 164' WITH BENTONITE CHIPS. ALLOW TO HYDRATE FOR AN HOUR PRIOR TO SETTING FILTER PACK AND WELL. SET WELL AT 164'. USE 5' OF SCH. 80 2.5" WELL SCREEN FROM 164' TO 159'. FILTER PACK CONSISTS OF #7 SAND FROM 164' TO 148.50'. BENTONITE SEAL W/ BENTONITE CHIPS (3/8") FROM 148.50' TO 143.50'. ALLOW BENTONITE TO HYDRATE OVERNIGHT. GROUT FROM 144.50' TO 3' BELOW GROUND SURFACE WITH TREMIE PIPE USING HIGH SOLIDS BENTONITE GROUT ON 9/21/16.	

SD-1611D
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6886898.54

East Coordinates: 11830231.84

Installed: 10/5/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 169.9'

Pump Tip Elevation (ftmsl): 17.14

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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BORING LOG

PROJECT NO. C150132.00
PROJECT NAME Possum Point
PROJECT LOCATION Dumfries, VA
DRILLER NAME/COMPANY Boss / Duncan Brothers Drilling
EQUIPMENT USED: Sonic Drill SD-450 (SN: SDC 09041)
DRILLING METHODS: Sonic with 6" outter and 4" Inner barrel; 10' runs
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: PWM REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1611D
SHEET 1 OF 5
DATE: START 10/2/16 END 10/5/16
ELEV: 184.79'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS Northing: 6886898.54 Easting: 11830231.84
0.0									
			6.0'	60	2.5	CL		Lean CLAY, orange brown, Very Stiff 2.0' little Subrounded Gravel. [Fill]	
	S-1				3.0	CL	moist	Lean CLAY, orange to orange-brown, very blocky, Stratified with gray layers little fine grained sand, little gravel, fine to medium rounded to subrounded, [alluvium] 10.0'	[dull apperance]
10.0									
			5.0'	50		SC SM		Clayey to Silty SAND, Very fine grained, gray brown to light brown. 20.0'	
	S-2						damp		
20.0									
			8.0'	80		SM		Silty SAND, very fine grained poorly Graded, light brown to orange brown	[Slightly Sticky]
	S-3						damp		
30.0									
			5.0'	50					
	S-4						damp		
40.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1611D
SHEET 2 OF 5
DATE: START 10/2/11 END 10/5/11
ELEV: 184.79'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
40.0			10.0	100		SM	damp	Silty SAND, (continued) - Cemented silty sand at 42.0 - 43.2'	
	S-5								
50.0			8.0	80				54.0'	
	S-6					SP-SM	damp	SAND, with some silt, Poorly Graded, fine grained, gray to light orange brown, trace fine gravel Rounded.	
60.0			9.0	90					
	S-7						damp		
70.0			6.0'	60				- from 69.0 to 76.5 well graded gravel, fine to medium grained, Subrounded to rounded.	
	S-8						moist	- Orange Iron staining 76.0 to 78.5.	
								78.5	
80.0						CH		Fat CLAY, (See next Page)	

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1611D
SHEET 3 OF 5
DATE: START 10/12/16 END 10/5/16
ELEV: 184.79'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
80.0									
	S-9		10.0	100	>4.5 3.5	CH	damp	Fat CLAY, gray mottled with orange, hard. - Predominatly Gray Color	[waxy apperance] [very Sticky]
90.0	S-10		10.0	100			damp	- little Sand very fine grained -Some Sand very fine grained - from 98.2 to 98.7 Sand lense very fine grained.	
100.0	S-11		10.0	100	4.0		damp	- becomes blocky at 105.0' and predominantly dark red.	
110.0	S-12		10.0	100	4.25		damp	- mottled gray	
120.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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BORING NO. SD-1611D
SHEET 4 OF 5
DATE: START 10/2/16 END 10/5/16
ELEV: 184.79'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENNESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
120.0									
	S-13		10.0	100	3.5	CH	damp	Fat CLAY, (continued) -Predominantly gray mottled dark red	
130.0								130.0'	
	S-14		9.0	90		SM	damp	Silty SAND, Fine grained uniformly graded, tan to gray.	[Slightly sticky]
140.0								143.0'	
	S-15		10.0	100	>4.5	CH	moist	Fat CLAY, and Sand, fine grained tan to gray, hard	
								146.0	
						SM		Silty SAND, fine grained, uniformly graded, tan to gray.	
150.0								152.0	
	S-16		10.0	100		SC	moist	Clayey SAND, fine to corse grained, with little to some subrounded to rounded, coarse to fine grained gravel. Gray -Clay seam 152.2 to 153.1 with gravel, well graded.	
160.0									

BORING LOG

PROJECT NO. _____
PROJECT NAME _____
PROJECT LOCATION _____
DRILLER NAME/COMPANY _____
EQUIPMENT USED: _____
DRILLING METHODS: _____
PRE CORE WATER DEPTH _____ DATE/TIME _____
0 HR WATER DEPTH (POST CORE) _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
_____ HR WATER DEPTH _____ DATE/TIME _____
CLASSIFIED BY: _____ REVIEWED BY: _____ DATE: _____

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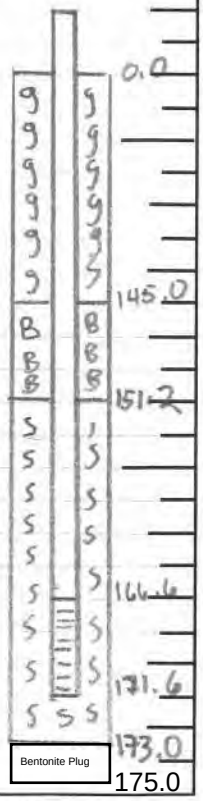
BORING NO. SD-1611D
SHEET 5 OF 5
DATE: START 10/2/16 END 10/5/16
ELEV: 184.79'

DEPTH (FT.)	SAMPLE NO. AND TYPE/CORE RUN	BLOWS/0.5 FT. ON SAMPLER	RECOVERY (FT.)	RECOVERY % / RQD %	POCKET PENETROMETER (TSF)	USCS OR ROCK BROKENESS	H2O CONTENT	DESCRIPTION Soil: Group Name, Color, State, [Origin] Rock: Type, Color, Hardness, Weathering, Bedding and Relative Dip, Joint Condition	REMARKS
160.0			9.0	90				Clayey SAND, (continued)	
	S-17					SC	moist	-trace Fine to medium subrounded to rounded gravel.	
170.0			5.0	100				171.6	
	S-18				>4.5	CH	damp	Fat CLAY, dark gray, homogeneous, hard.	
175.0								175.0 Boring Terminated at 175.0'	

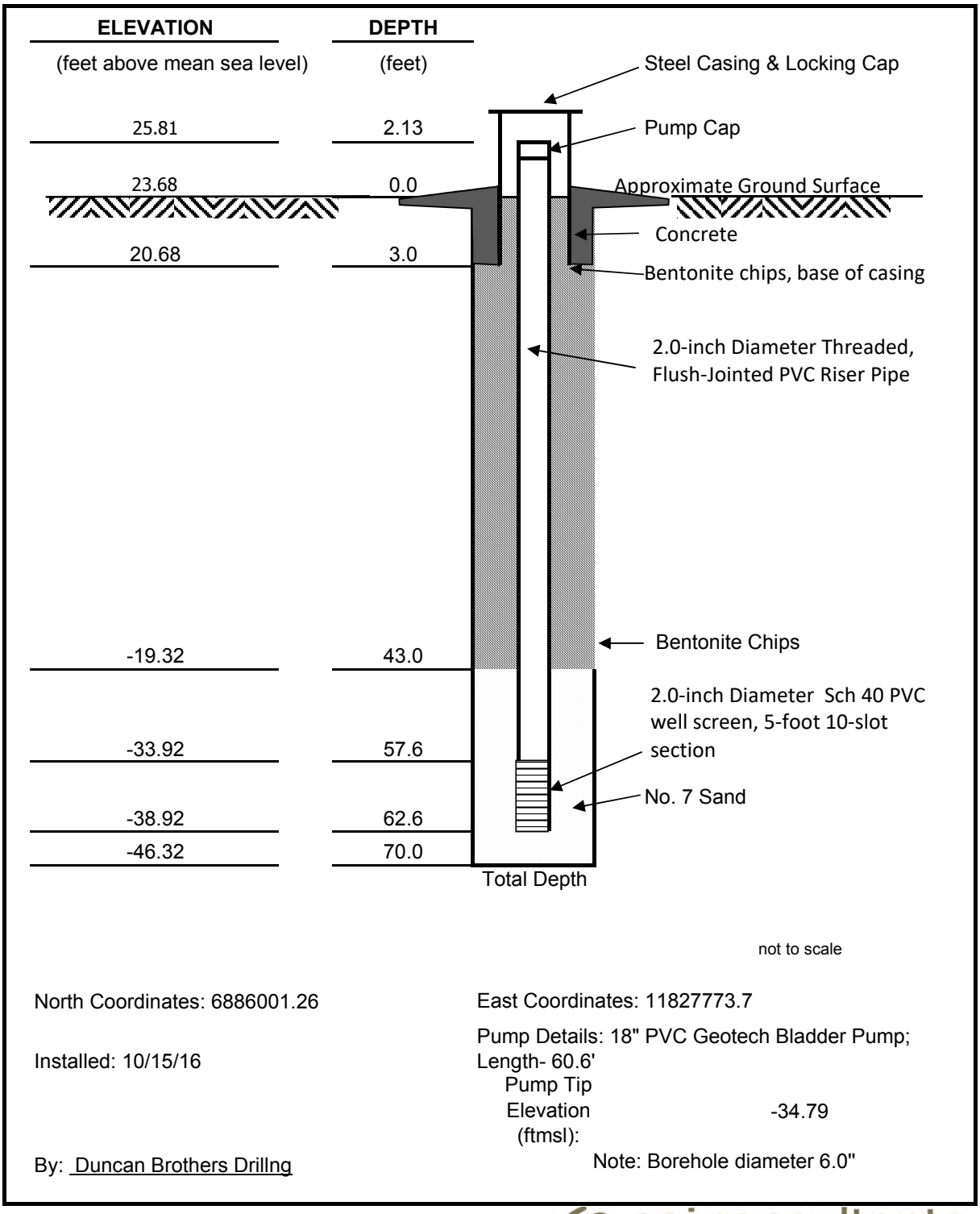
*Well Construction -
#7 Sand placed from 173.0' to 151.2 bgs (10 bags)
Well set at 171.6 bgs with 5' of SCH 80 2.5" well Screen from 171.6 to 166.6'
Bentonite chip plug 5'.0 from 151.2 to 145.0' chips allowed to hydrate overnight. Pumped grout the following day from 145.0' to 3.0'

Bentonite Plug from 175.0' to 173.0', allowed to hydrate for 2hrs



Not to Scale

T-1615D
Possum Point Power Station
Dominion
Record Detail



North Coordinates: 6886001.26

East Coordinates: 11827773.7

Installed: 10/15/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 60.6'

Pump Tip Elevation (ftmsl): -34.79

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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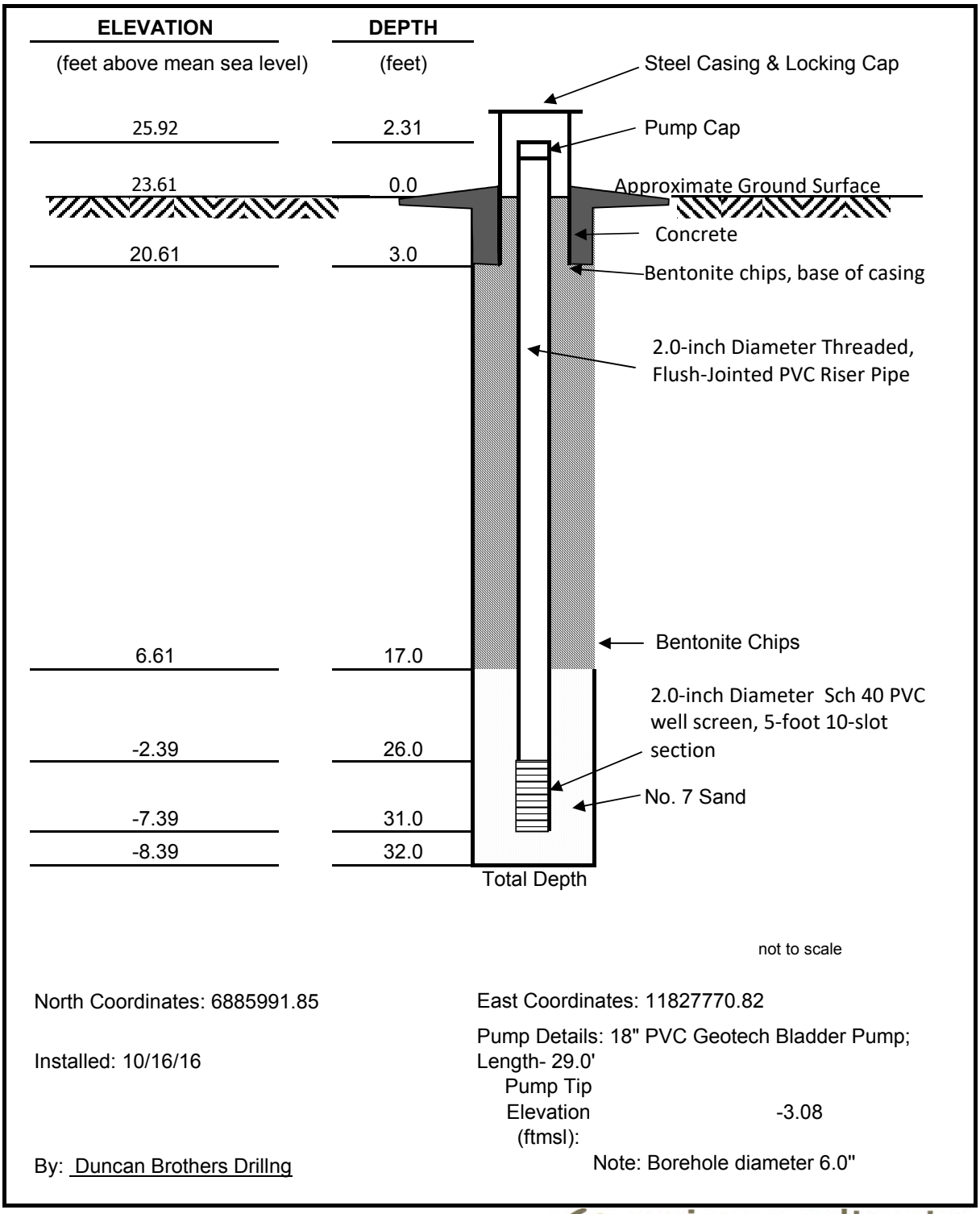
T-1615S
Possum Point Power Station
Dominion
Record Detail



not to scale

North Coordinates: 6885991.85

East Coordinates: 11827770.82

Installed: 10/16/16

Pump Details: 18" PVC Geotech Bladder Pump; Length- 29.0'

Pump Tip Elevation (ftmsl): -3.08

By: Duncan Brothers Drillng

Note: Borehole diameter 6.0"

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RECORD OF BOREHOLE MW-1D

SHEET 1 of 10

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
0		0.00 - 0.50 TOPSOIL, silty sand, fibrous organics, brown, native, NC, moist, compact.	SM		191.02 0.50						**WELL CASING** Interval: 0'-192' Material: PVC Diameter: 2-inch Joint Type: threaded
	190	0.50 - 18.00 (CL) SILTY CLAY, trace fine sand, trace organics, orange-brown, native, CO, W~PL, stiff.									**WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4"
											ANNULUS SEAL Interval: 0-178' Type: High Solids Bentonite Grout
5						1	SOIL CORE		5.00 10.00		**FILTER PACK SEAL** Interval: 178-187' Type: 3/8" Bentonite Chip
	185										**FILTER PACK** Interval: 187-202' Type: No. 2 Sand
											WELL SCREEN Interval: 192'-202' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: 2-inch
			CL								**DRILLING METHODS** Type: Rotosonic Notes:
10						2	SOIL CORE		3.50 10.00		
	180										
15											
	175										
					173.52 18.00						
		18.00 - 30.00 (SM) SILTY SAND, fine sand, some silt, orange and tan, micaceous, native, NC, moist, loose.									
20						3	SOIL CORE		4.00 10.00		
	170		SM								
25		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		18.00 - 30.00 (SM) SILTY SAND, fine sand, some silt, orange and tan, micaceous, native, NC, moist, loose. *(Continued)*	SM			3	SOIL CORE		4.00 / 10.00		
30	165				161.52						
		30.00 - 32.00 (CL) SILTY CLAY, trace fine sand, tan and orange-brown, native, CO, W~PL, firm.	CL		30.00						
	160				159.52						
		32.00 - 53.00 (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, orange and yellow, micaceous, native, NC, moist, loose.			32.00	4	SOIL CORE		4.00 / 10.00		
35	155										
40			SM			5	SOIL CORE		6.50 / 10.00		
	150										
45											
	145										
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		32.00 - 53.00 (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, orange and yellow, micaceous, native, NC, moist, loose. *(Continued)*	SM		138.52 53.00						
55	140	53.00 - 76.00 (SM) SILTY SAND, fine sand, poorly sorted, some silt, light tan with dark orange staining, micaceous, native, NC, moist, compact.	SM			6	SOIL CORE		8.00 10.00		
60	135										
65	130					7	SOIL CORE		14.00 20.00		
70	125										
75	120										

Log continued on next page

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75			SM		115.52						
	115	76.00 - 93.00 (SM) SILTY SAND, medium sand, poorly sorted, some silt, light tan-gray with sporadic orange staining, native, NC, moist, loose.			76.00	7	SOIL CORE		14.00 20.00		
80											
	110										
			SM								
85											
	105										
										Bentonite Grout	
90						8	SOIL CORE		7.50 20.00		
	100				98.52						
		93.00 - 96.00 (SP) SAND, medium, poorly sorted, trace silt and clay, light tan and light gray, native, semi-cohesive, moist, compact.	SP		93.00						
95					95.52						
	95	96.00 - 100.00 (SM) SILTY SAND, fine to medim sand, poorly sorted, some silt, trace angular gravel, orange and gray, abundant quartz, NC, moist, compact.	SM		96.00						
100					91.52						

Log continued on next page

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
100		100.00 - 105.00 (SM) gravelly SILTY SAND, medium sand, poorly sorted, some subrounded gravel, some silt, light brown-orange, native, NC, wet, loose.	SM		100.00						
	90				86.52						
105		105.00 - 107.00 (SM) SILTY SAND, medium to coarse sand, poorly sorted, some silt, light gray with sporadic orange staining, native, NC, moist, loose.	SM		105.00						
	85				84.52						
		107.00 - 110.00 (GM) sandy SILTY GRAVEL, subrounded coarse gravel, medium to coarse sand, some silt, brown-orange, white, black, native, NC, wet, loose.	GM		107.00						
110					81.52	9	SOIL CORE		15.00 20.00		
		110.00 - 116.00 (SM) gravelly SILTY SAND, medium sand, poorly sorted, some subrounded gravel, some silt, light brown, native, NC, wet, loose.	SM		110.00						
	80										
115					75.52						
		116.00 - 118.00 (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, tan and orange, native, NC, moist, compact.	SM		116.00						
	75				73.52						
		118.00 - 118.50 (SM) SILTY SAND, fine sand, poorly sorted, some silt, light tan, native, NC, dry, dense.	SM		118.00 73.02						
		118.50 - 120.00 (CL) SILTY CLAY, brown orange to red, native, CO, W<PL, hard.	CL		118.50						
120					71.52						
		120.00 - 130.00 (CL) SANDY CLAY, fine sand, greenish gray with yellow-red sporadic staining, micaceous, native, CO, W~PL, hard.	CL		120.00	10	SOIL CORE		20.00 20.00		
	70										
125		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
125		120.00 - 130.00 (CL) SANDY CLAY, fine sand, greenish gray with yellow-red sporadic staining, micaceous, native, CO, W~PL, hard. *(Continued)*	CL		61.52						
130	65	130.00 - 135.50 (CL) SANDY CLAY, fine to medium sand, dark greenish gray with dark yellowish brown staining, micaceous, native, CO, W~PL, hard.	CL		130.00	10	SOIL CORE		20.00 20.00		
135	60	135.50 - 137.00 (CL) SANDY CLAY, fine and medium sand, grayish green, micaceous, native, CO, W>PL, stiff.	CL		56.02 135.50						
140	55	137.00 - 145.00 (CL) SANDY CLAY, fine and medium sand, trace subrounded gravel, very dark grayish green, micaeous, native, CO, W>PL, firm.	CL		54.52 137.00						
145	50	145.00 - 149.00 (SC) CLAYEY SAND, medium to coarse sand, dark greenish gray, micaceous, native, semi-cohesive, moist, compact.	SC		46.52 145.00	11	SOIL CORE		17.00 20.00		
150	45	149.00 - 153.50 (SM) SILTY SAND, medium sand, poorly sorted, some silt, greenish gray, native, NC, moist, compact.	SM		42.52 149.00						
		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
150		149.00 - 153.50 (SM) SILTY SAND, medium sand, poorly sorted, some silt, greenish gray, native, NC, moist, compact. *(Continued)*	SM		38.02						
	40										
		153.50 - 165.00 (SM) SILTY SAND, medium sand, poorly sorted, some silt, brownish yellow, micaceous, abundant quartz, native, NC, wet, compact to loose at 158'.	SM		153.50	11	SOIL CORE		17.00 20.00		
155											
	35										
160											
	30										
165					26.52						
		165.00 - 178.00 (SC) CLAYEY SAND, medium sand, poorly sorted, greenish gray, native, NC, moist, compact.	SC		165.00	12	SOIL CORE		20.00 20.00		
	25										
170											
	20										
175		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
175	15	165.00 - 178.00 (SC) CLAYEY SAND, medium sand, poorly sorted, greenish gray, native, NC, moist, compact. *(Continued)*	SC		13.52	12	SOIL CORE		20.00 20.00		
		178.00 - 180.00 (CL) SILTY CLAY, trace fine green sand, brown, native, CO, W<PL, hard.	CL		178.00 11.52						
180	10	180.00 - 184.50 (CL) SANDY CLAY, fine sand, dark greenish gray, micaceous, native, CO, W<PL, hard.	CL		180.00 7.02					3/8" Bentonite Chip	
185	5	184.50 - 190.00 (SC) CLAYEY SAND, medium to coarse sand, poorly sorted. dark greenish gray, native, NC, moist, compact.	SC		184.50 1.52	13			17.00 20.00		
190	0	190.00 - 195.50 (SC) CLAYEY SAND, medium to coarse sand, poorly sorted, trace subrounded gravel, dark greenish gray, native, NC, moist, compact.	SC		190.00 -3.98					No. 2 Sand	
195	-5	195.50 - 200.00 (GC) SANDY CLAYEY GRAVEL, medium to coarse sand, poorly sorted, dark greenish gray, native, NC, moist, compact.	GC		195.50 -8.48					0.01-inch Screen	
200		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
200		200.00 - 207.50 (SC) CLAYEY SAND, medium sand, poorly sorted, greenish gray, homogenous, native, NC, moist, compact.	SC		200.00						
	-10										
205	-15				-15.98					No. 2 Sand	
		207.50 - 211.00 (SC) CLAYEY SAND, fine to medium sand, poorly sorted, sporadic seams of clay, dark gray, native, NC, moist, compact.	SC		207.50						
210					-19.48	14	SOIL CORE		20.00 20.00		
	-20	211.00 - 218.00 (SC) SANDY CLAY, fine sand, very dark greenish gray, native, CO, W<PL, hard.	SC		211.00						
215	-25				-26.48						
		218.00 - 225.00 (SC) CLAYEY SAND, fine to medium sand, poorly sorted, dark greenish gray, native, NC, moist, compact.	SC		218.00						
220	-30					15	SOIL CORE		15.00 15.00	3/8" Bentonite Chip	
225		Log continued on next page			-33.48						

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 235.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/5/19
DATE COMPLETED: 2/7/19

NORTHING: 6,887,303.30
EASTING: 11,832,287.38
GS ELEVATION: 191.52 ft
TOC ELEVATION: 194.63 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
225		225.00 - 233.50 (CL) SANDY CLAY, fine sand, dark gray, native, CO, W~PL, hard.	CL		225.00	15	SOIL CORE		15.00 15.00		
	-35										
230											
	-40										
					-41.98						
		233.50 - 235.00 (SC) CLAYEY SAND, fine to medium sand, poorly sorted, dark greenish, gray, native, NC, moist, compact.	SC		233.50						
235					-43.48						
		Boring completed at 235.00 ft									
	-45										
240											
	-50										
245											
	-55										
250											

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
0		0.00 - 0.50 TOPSOIL, silty sand, fibrous organics, brown, native, NC, moist, compact.	SM		191.90 0.50		**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
	190	0.50 - 18.00 (CL) SILTY CLAY, trace fine sand, trace organics, orange-brown, native, CO, W~PL, stiff.					
5							
	185						
10			CL				
	180						
15							
	175				174.40 18.00		
		18.00 - 30.00 (SM) SILTY SAND, fine sand, some silt, orange and tan, micaceous, native, NC, moist, loose.					
20			SM				
	170						
25		Log continued on next page					

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
25		18.00 - 30.00 (SM) SILTY SAND, fine sand, some silt, orange and tan, micaceous, native, NC, moist, loose. *(Continued)*					**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded
	165		SM				**WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4"
							ANNULUS SEAL Interval: 0'-144.5' Type: Betonite Grout
30					162.40		**FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip
		30.00 - 32.00 (CL) SILTY CLAY, trace fine sand, tan and orange-brown, native, CO, W~PL, firm.			30.00		
			CL				**FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand
					160.40		
	160	32.00 - 53.00 (SM) SILTY SAND. fine to medium sand, poorly sorted, some silt, orange and yellow, micaceous, native, NC, moist, loose.			32.00		**WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
35							
	155						
40			SM				
	150						
45							
	145						
50		Log continued on next page					

LOG SCALE: 1 in = 3.13 ft
DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege
PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
50		32.00 - 53.00 (SM) SILTY SAND. fine to medium sand, poorly sorted, some silt, orange and yellow, micaceous, native, NC, moist, loose. *(Continued)*	SM		139.40 53.00		**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
55	140						
60	135	53.00 - 76.00 (SM) SILTY SAND, fine sand, poorly sorted, some silt, light tan with dark orange staining, micaceous, native, NC, moist, compact.	SM				
65	130						
70	125						
75	120					Bentonite Grout	

Log continued on next page

LOG SCALE: 1 in = 3.13 ft
DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
75		53.00 - 76.00 (SM) SILTY SAND, fine sand, poorly sorted, some silt, light tan with dark orange staining, micaceous, native, NC, moist, compact. *(Continued)*	SM		116.40		**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
		76.00 - 93.00 (SM) SILTY SAND, medium sand, poorly sorted, some silt, light tan-gray with sporadic orange staining, native, NC, moist, loose.			76.00		
80	115						
	110						
85			SM				
	105						
90							
	100				99.40		
		93.00 - 96.00 (SP) SAND, medium, poorly sorted, trace silt and clay, light tan and light gray, native, semi-cohesive, moist, compact.	SP		93.00		
95					96.40		
		96.00 - 100.00 (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, trace angular gravel, orange andn gray, abundant quartz, NC, moist, compact.	SM		96.00		
	95						
100					92.40		
		Log continued on next page					

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
100		100.00 - 105.00 (SM) gravelly SILTY SAND, medium sand, poorly sorted, some subrounded gravel, some silt, light brown-orange, native, NC, wet, loose.	SM		100.00		**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
	90				87.40		
105		105.00 - 107.00 (SM) SILTY SAND, medium to coarse sand, poorly sorted, some silt, light gray with sporadic orange stainng, native, NC, moist, loose.	SM		105.00		
					85.40		
	85	107.00 - 110.00 (GM) sandy SILTY GRAVEL, subrounded coarse gravel, medium to coarse sand, some silt, brown-orange, white, black, native, NC, wet, loose.	GM		107.00		
					82.40		
110		110.00 - 116.00 (SM) gravelly SILTY SAND, medium sand, poorly sorted, some subrounded gravel, some silt, light brown, native, NC, wet, loose.	SM		110.00		
	80						
115					76.40		
		116.00 - 118.00 (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, tan and orange, native, NC, moist, compact.	SM		116.00		
	75				74.40		
		118.00 - 118.50 (SM) SILTY SAND, fine sand, poorly sorted, some silt, light tan, native, NC, dry, loose.	SM		118.00 73.90		
		118.50 - 120.00 (CL) SILTY CLAY, brown orange to red, native, NC, dry, dense.	CL		118.50		
120					72.40		
		120.00 - 130.00 (CL) SANDY CLAY, fine sand, greenish gray with yellow-red sporadic staining, micaceous, native, CO, W~PL, hard.	CL		120.00		
	70						
125		Log continued on next page					

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
125		120.00 - 130.00 (CL) SANDY CLAY, fine sand, greenish gray with yellow-red sporadic staining, micaceous, native, CO, W~PL, hard. *(Continued)*	CL				**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
	65						
130					62.40		
		130.00 - 135.00 (CL) SANDY CLAY, fine to medium sand, dark greenish gray with dark yellowish brown staining, micaceous, native, CO, W~PL, hard.	CL		130.00		
	60						
135					57.40		
		135.00 - 137.00 (CL) SANDY CLAY, fine and medium sand, grayish green, micaceous, native, CO, W>PL, stiff.	CL		135.00		
					55.40		
	55	137.00 - 145.00 (CL) SANDY CLAY, fine and medium sand, trace subrounded gravel, very dark grayish green, micaceous, native, CO, W>PL, firm.	CL		137.00		
140							
	50						
145					47.40		
		145.00 - 149.00 (SC) CLAYEY SAND, medium and coarse sand, dark greenish gray, micaceous, native, semi-cohesive, moist, compact.	SC		145.00	3/8" Bentonite Chip	
	45						
					43.40		
		149.00 - 153.50 (SM) SILTY SAND, medium sand, poorly sorted, some silt, greenish gray, native, NC, moist, compact.	SM		149.00		
150		Log continued on next page					

LOG SCALE: 1 in = 3.13 ft
DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege
PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-1S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 164.50 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/8/19
DATE COMPLETED: 2/8/19

NORTHING: 6,887,292.08
EASTING: 11,832,305.43
GS ELEVATION: 192.40 ft
TOC ELEVATION: 195.22

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
150	40	149.00 - 153.50 (SM) SILTY SAND, medium sand, poorly sorted, some silt, greenish gray, native, NC, moist, compact. *(Continued)*	SM		38.90		**WELL CASING** Interval: 0'-154.5' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-144.5' Type: Betonite Grout **FILTER PACK SEAL** Interval: 144.5'-149.5' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 149.5'-164.5' Type: No. 2 Sand **WELL SCREEN** Interval: 154.5'-164.5' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC
155	35	153.50 - 165.00 (SM) SILTY SAND, medium sand, poorly sorted, some silt, brownish yellow, micaceous, abundant quartz, native, NC, wet, compact to loose at 158'.	SM		153.50	No. 2 Sand 0.01-inch Screen	
160	30						
165	25	Boring completed at 164.50 ft			27.40 165.00		
170	20						
175							

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3D

SHEET 1 of 5

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/25/19
DATE COMPLETED: 1/26/19

NORTHING: 6,884,503.24
EASTING: 118,320,099.57
GS ELEVATION: 76.43 ft
TOC ELEVATION: 79.84 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
0		0.00 - 0.50 [TOPSOIL] ORGANIC SILT; dark brown; moist, loose.	OL		75.93 / 0.50						**WELL CASING** Interval: 0'-112' Material: PVC Diameter: 2-inch Joint Type: threaded
	75	0.50 - 8.00 Gap-graded fine and coarse (mostly fine) SAND with trace fine to coarse gravel (rounded quartzite) and trace high-plasticity fines; yellow-green and orange, transitions to reddish-brown at 1.0'; moist, loose. *Sand contains mica and quartzite.	SP								**WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4"
5						S-1	DP		3.70 / 10.00		**ANNULUS SEAL** Interval: 0.0'-3.0' Type: Concrete
	70				68.43						**FILTER PACK SEAL** Interval: 108.0'-110.0' Type: Hydrated bentonite
		8.00 - 15.50 Fine SAND with some plastic fines and trace fine gravel (rounded quartzite); orange-brown; moist, loose to compact.	SP		8.00						**FILTER PACK** Interval: 110.0'-117.0' Type: No. 2 Sand
10											**WELL SCREEN** Interval: 112.0'-117.0' Material: PVC Diameter: 2-inch Slot Size: 0.010" End Cap: PVC
	65										
15					60.93	S-2	DP		5.00 / 10.00		**DRILLING METHODS** Type: Rotosonic Notes:
	60	15.50 - 20.00 Fine to coarse CLAYEY SAND with trace fine to coarse gravel; orange and yellow; moist, compact.	SC		15.50						
20					56.43						
	55	20.00 - 24.00 Fine to coarse SAND with trace fine gravel and some high-plasticity fines; reddish-brown; moist, compact. Coarse sand mainly derived from quartzite.	SW		20.00	S-3	DP		8.50 / 10.00		
					52.43						
		24.00 - 27.00 Fine to coarse CLAYEY SAND with some fine (rounded quartzite) gravel.	SC		24.00						
25		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/25/19
DATE COMPLETED: 1/26/19

NORTHING: 6,884,503.24
EASTING: 118,320,099.57
GS ELEVATION: 76.43 ft
TOC ELEVATION: 79.84 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		24.00 - 27.00 Fine to coarse CLAYEY SAND with some fine (rounded quartzite) gravel. *(Continued)*	SC		49.43						
	50	27.00 - 30.00 CLAY and fine SAND; turquoise with red and orange mottling (heavy oxidation staining at 27', with medium sand lens); w<PL, very stiff.	CH/SP		27.00 46.43	S-3	DP		8.50 10.00		
30		30.00 - 35.00 Fine SAND and CLAY; turquoise-grey with bedding alternations; w<PL, very stiff (PP>4.5 tsf)	SP/CH		30.00 41.43	S-4	DP		10.00 10.00		
35		35.00 - 38.50 Fine SAND and CLAY; brown-mottled green; thin bedding; w~PL, stiff.	SP/CH		35.00 37.93						
	40	38.50 - 39.00 SILTY CLAY; brown; w>PL, stiff.	CL		38.50 37.43						
		39.00 - 48.00 Very fine CLAYEY SILTY SAND; greenish-blue; dry, very dense	SM		39.00 28.43	S-5	DP		10.00 10.00		
45	35	48.00 - 51.00 Very fine SAND and CLAYEY SILT; turquoise with brown mottling; dry, very dense/stiff.	SP/MH		48.00						
	30										
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE MW-3D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/25/19
DATE COMPLETED: 1/26/19

NORTHING: 6,884,503.24
EASTING: 118,320,099.57
GS ELEVATION: 76.43 ft
TOC ELEVATION: 79.84 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		48.00 - 51.00 Very fine SAND and CLAYEY SILT; turquoise with brown mottling; dry, very dense/stiff. *(Continued)*	SP/MH		25.43						
	25	51.00 - 54.50 Very fine to fine SILTY SAND; turquoise; dry, very dense (almost cemented in places).	SM		51.00 21.93					Bentonite Grout	
55		54.50 - 55.00 Fine to medium SAND with some silt; grey; dry, very dense/cemented.	SP		54.50 21.43	S-6	DP		10.00		
	20	55.00 - 58.00 Sandy CLAYEY SILT; orange yellow with small nodules of fine orange-red sand; dry, very dense.	MH		55.00 18.43				10.00		
		58.00 - 68.50 Fine to coarse SAND with trace fines; grey; moist to wet, compact to dense.	SW		58.00						
60											
	15										
65						S-7	DP		10.00		
	10								10.00		
		68.50 - 70.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense, semi-cemented.	SM		7.93 68.50 6.43						
70		70.00 - 74.00 Fine to coarse SAND with some fine to coarse gravel (rounded quartzite) and trace fines; grey; moist to wet, compact to dense	SW		70.00						
	5					S-8	DP		10.00		
									10.00		
		74.00 - 76.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense. (At 76' heavy red oxidation staining and coarse sand)	SM		2.43 74.00						
75		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/25/19
DATE COMPLETED: 1/26/19

NORTHING: 6,884,503.24
EASTING: 118,320,099.57
GS ELEVATION: 76.43 ft
TOC ELEVATION: 79.84 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		74.00 - 76.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense. (At 76' heavy red oxidation staining and coarse sand) *(Continued)*	SM		0.43						
	0	76.00 - 78.00 Fine to coarse SAND and CLAY; brown-mottled grey; dry, very stiff.	SW/CH		76.00 -1.57	S-8	DP		10.00 10.00		
		78.00 - 80.00 Fine to coarse SAND with some plastic fines (discrete clay lenses); grey; dry, very dense.	SW-SC		78.00 -3.57						
80		80.00 - 91.00 Medium to coarse SAND; turquoise-grey; moist to wet, very dense to dense. (Heavy oxidation staining at 82', occasional thin clay lenses)			80.00						
	-5										
85			SP			S-9	DP		10.00 10.00		
	-10										
90					-14.57						
	-15	91.00 - 94.50 Fine SAND and CLAY; turquoise and orange-brown; w<PL, very stiff.	SP/CH		91.00 -18.07						
95		94.50 - 100.00 Medium SAND with trace fine gravel (rounded quartzite); grey; very dense, moist to wet.			94.50	S-10	DP		10.00 10.00		
	-20		SP								
100					-23.57						

Log continued on next page

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3D

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/25/19
DATE COMPLETED: 1/26/19

NORTHING: 6,884,503.24
EASTING: 118,320,099.57
GS ELEVATION: 76.43 ft
TOC ELEVATION: 79.84 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
100		100.00 - 111.00 Fine to medium SAND with trace gravel; grey; moist to wet, compact to dense.	SP		100.00	S-11	DP		10.00 10.00		
	-25										
105											
	-30										
110					-34.57					3/8" Bentonite Chip	
	-35	111.00 - 117.00 CLAY; dark grey; w<PL, very stiff to hard.	CH		111.00	S-12	DP		10.00 10.00	No. 2 Sand 0.01-inch Screen	
115											
	-40				-40.57						
		117.00 - 120.00 Fine SAND with some plastic fines; grey; very dense.	SP		117.00					3/8" Bentonite Chip	
120		Boring completed at 120.00 ft			-43.57						
	-45										
125											

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3S

SHEET 1 of 5

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 105.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,497.97
EASTING: 11,832,103.03
GS ELEVATION: 76.22 ft
TOC ELEVATION: 79.58 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0	76	0.00 - 0.50 [TOPSOIL] ORGANIC SILT; dark brown; moist, loose.	OL		75.72					Annulus Seal (Cement)
		0.50 - 8.00 Gap-graded fine and coarse (mostly fine) SAND with trace fine to coarse gravel (rounded quartzite) and trace high-plasticity fines; yellow-green and orange, transitions to reddish-brown at 1.0'; moist, loose. *Sand contains mica and quartzite.	SP		0.50 68.22					
5	71									
		8.00 - 15.50 Fine SAND with some plastic fines and trace fine gravel (rounded quartzite); orange-brown; moist, loose to compact.	SP		8.00 60.72					
10	66									
15	61	15.50 - 20.00 Fine to coarse CLAYEY SAND with trace fine to coarse gravel; orange and yellow; moist, compact.	SC		15.50 56.22					
20	56	20.00 - 24.00 Fine to coarse SAND with trace fine gravel and some high-plasticity fines; reddish-brown; moist, compact. Coarse sand mainly derived from quartzite.	SW		20.00 52.22					
25	51	24.00 - 27.00 Fine to coarse CLAYEY SAND with some fine (rounded quartzite) gravel.	SC		24.00					

Log continued on next page

WELL CASING
Interval: 0'-95'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad:
Protective Casing:

ANNULUS SEAL
Interval: 0.0'-3.0'
Type: Concrete

FILTER PACK SEAL
Interval: 89.0'-91.0'
Type: Hydrated bentonite

FILTER PACK
Interval: 91.0'-105.0'
Type: No. 2 Sand

WELL SCREEN
Interval: 95.0'-105.0'
Material: Polyvinyl Chloride (PVC)
Diameter: 2.0
Slot Size: 0.010"
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 105.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,497.97
EASTING: 11,832,103.03
GS ELEVATION: 76.22 ft
TOC ELEVATION: 79.58 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25	50	24.00 - 27.00 Fine to coarse CLAYEY SAND with some fine (rounded quartzite) gravel. *(Continued)*	SC		49.22						
		27.00 - 30.00 CLAY and fine SAND; turquoise with red and orange mottling (heavy oxidation staining at 27', with medium sand lens); w<PL, very stiff.	CH/SP		27.00 46.22						
30	45	30.00 - 35.00 Fine SAND and CLAY; turquoise-grey with bedding alternations; w<PL, very stiff (PP>4.5 tsf)	SP/CH		30.00 41.22						
35	40	35.00 - 38.50 Fine SAND and CLAY; brown-mottled green; thin bedding; w~PL, stiff.	SP/CH		35.00 37.72						
		38.50 - 39.00 SILTY CLAY; brown; w>PL, stiff.	CL		38.50 37.22						
		39.00 - 48.00 Very fine CLAYEY SILTY SAND; greenish-blue; dry, very dense	SM		39.00 28.22					Bentonite backfill	
45	30	48.00 - 51.00 Very fine SAND and CLAYEY SILT; turquoise with brown mottling; dry, very dense/stiff.	SP/MH		48.00						
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 105.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,497.97
EASTING: 11,832,103.03
GS ELEVATION: 76.22 ft
TOC ELEVATION: 79.58 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		48.00 - 51.00 Very fine SAND and CLAYEY SILT; turquoise with brown mottling; dry, very dense/stiff. *(Continued)*	SP/MH		25.22						
	25	51.00 - 54.50 Very fine to fine SILTY SAND; turquoise; dry, very dense (almost cemented in places).	SM		51.00 21.72						
55		54.50 - 55.00 Fine to medium SAND with some silt; grey; dry, very dense/cemented.	SP		54.50 21.22						
	20	55.00 - 58.00 Sandy CLAYEY SILT; orange yellow with small nodules of fine orange-red sand; dry, very dense.	MH		55.00 18.22						
60		58.00 - 68.50 Fine to coarse SAND with trace fines; grey; moist to wet, compact to dense.	SW		58.00 7.72						
65	15	68.50 - 70.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense, semi-cemented.	SM		68.50 6.22						
70	10	70.00 - 74.00 Fine to coarse SAND with some fine to coarse gravel (rounded quartzite) and trace fines; grey; moist to wet, compact to dense	SW		70.00 2.22						
	5	74.00 - 76.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense. (At 76' heavy red oxidation staining and coarse sand)	SM		74.00						
75		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 105.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,497.97
EASTING: 11,832,103.03
GS ELEVATION: 76.22 ft
TOC ELEVATION: 79.58 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		74.00 - 76.00 Fine CLAYEY SILTY SAND; turquoise-grey; dry, very dense. (At 76' heavy red oxidation staining and coarse sand) *(Continued)*	SM		0.22						
	0	76.00 - 78.00 Fine to coarse SAND and CLAY; brown-mottled grey; dry, very stiff.	SW/CH		76.00 -1.78						
		78.00 - 80.00 Fine to coarse SAND with some plastic fines (discrete clay lenses); grey; dry, very dense.	SW-SC		78.00 -3.78						
80		80.00 - 91.00 Medium to coarse SAND; turquoise-grey; moist to wet, very dense to dense. (Heavy oxidation staining at 82', occasional thin clay lenses)			80.00						
	-5										
85			SP								
	-10										
90										Filter pack Seal (Bentonite grout)	
	-15	91.00 - 94.50 Fine SAND and CLAY; turquoise and orange-brown; w<PL, very stiff.	SP/CH		91.00 -14.78 -18.28						
95		94.50 - 100.00 Medium SAND with trace fine gravel (rounded quartzite); grey; very dense, moist to wet.			94.50						
	-20		SP							Filter pack (No. 2 Sand)	
100					-23.78					0.010"	

Log continued on next page

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-3S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 105.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,497.97
EASTING: 11,832,103.03
GS ELEVATION: 76.22 ft
TOC ELEVATION: 79.58 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
100		100.00 - 111.00 Fine to medium SAND with trace gravel; grey; moist to wet, compact to dense.	SP		100.00					Slotted Screen	
	-25										
105											
	-30									Bentonite Chips	
110					-34.78						
	-35	Boring completed at 105.00 ft			111.00						
115											
	-40										
120											
	-45										
125											

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4S

SHEET 1 of 5

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 110.00 ft
DRILL METHOD: Rotosonic

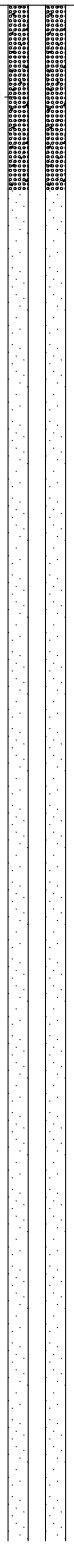
DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/24/19
DATE COMPLETED: 1/29/19

NORTHING: 6,883,377.83
EASTING: 11,831,452.65
GS ELEVATION: 56.86 ft
TOC ELEVATION: 59.86 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT
0		0.00 - 0.50 [TOPSOIL] ORGANIC SILT; dark brown; moist.			56.36				
	55	0.50 - 4.00 Sandy CLAY with trace fine gravel (rounded quartzite); light red-brown; w~PL, stiff.	CH		0.50 52.86				
5	50	4.00 - 9.00 Fine to medium SAND and CLAY; alternating orange and green; w~PL, stiff.	SP/CH		4.00 47.86	S-1	DP		4.00 10.00
10	45	9.00 - 13.00 Medium to coarse SAND with some plastic fines and trace fine gravel (rounded quartzite); yellow-brown; wet, compact.	SP		9.00 43.86				
15	40	13.00 - 20.00 CLAY with some fine to coarse sand; green with red-brown mottling; w<PL, very stiff.	CH		13.00 36.86	S-2	DP		8.00 10.00
20	35	20.00 - 28.50 CLAY with some fine to coarse sand and trace (rounded quartzite) gravel; grey-green with red-brown mottling; w<PL, very stiff.	CH		20.00	S-3	DP		6.00 10.00
25		Log continued on next page							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS / COMMENTS

WELL CASING
Interval: 0'-87'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad: 3'x3'
Protective Casing: 4"x4"

ANNULUS SEAL
Interval: 0.0'-3.0'
Type: Concrete

FILTER PACK SEAL
Interval: 81.0'-83.0'
Type: Hydrated bentonite

FILTER PACK
Interval: 83.0'-96.0'
Type: No. 2 Sand

WELL SCREEN
Interval: 87.0'-92.0'
Material: Polyvinyl Chloride (PVC)
Diameter: 2.0
Slot Size: 0.010"
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE MW-4S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 110.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/24/19
DATE COMPLETED: 1/29/19

NORTHING: 6,883,377.83
EASTING: 11,831,452.65
GS ELEVATION: 56.86 ft
TOC ELEVATION: 59.86 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25	30	20.00 - 28.50 CLAY with some fine to coarse sand and trace (rounded quartzite) gravel; grey-green with red-brown mottling; w<PL, very stiff. *(Continued)*	CH		28.36	S-3	DP		6.00 / 10.00		
30	25	28.50 - 35.00 CLAY with some fine to medium sand and trace gravel; mostly red, with visible bedding structure; w<PL, very stiff.	CH		28.50						
35	20	35.00 - 40.00 Sandy CLAY with some fine, angular gravel (broken from larger weakly cemented rock); grey; w<PL, very stiff.	CH		21.86 35.00 16.86	S-4	DP		5.00 / 10.00		
40	15	40.00 - 43.00 Fine to coarse SAND with some high-plasticity fines; grey/olive color; very dense, moist.	SW-SC		40.00 13.86					Bentonite backfill	
45	10	43.00 - 47.00 Fine to medium CLAYEY SAND; blue-green; very dense, moist.	SC		43.00 9.86	S-5	DP		7.00 / 10.00		
50		47.00 - 48.50 Fine to medium SAND with some high-plasticity fines; grey and yellow; very dense, moist.	SP-SC		47.00 8.36						
		48.50 - 49.00 CLAY and SAND; olive-yellow; w<PL, very stiff.	CH/SP		48.50 7.86						
		49.00 - 51.00 Fine to medium SAND; grey; very dense, moist to wet.	SP		49.00						

Log continued on next page

LOG SCALE: 1 in = 3.13 ft
DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 110.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/24/19
DATE COMPLETED: 1/29/19

NORTHING: 6,883,377.83
EASTING: 11,831,452.65
GS ELEVATION: 56.86 ft
TOC ELEVATION: 59.86 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		49.00 - 51.00 Fine to medium SAND; grey; very dense, moist to wet. *(Continued)*	SP		5.86						
	5	51.00 - 54.00 Sandy CLAY; blue-green; w<PL, very stiff. (Higher sand fraction from 52.0'-52.3')	CH		51.00 2.86						
		54.00 - 55.00 Fine SAND and CLAY; blue-green; very stiff.	SP/CH		54.00 1.86	S-6	DP		10.00		
55		55.00 - 56.00 Sandy CLAY; brown and blue; w<PL, very stiff	CH		55.00 0.86				10.00		
		56.00 - 56.30 Fine to medium SAND with some plastic fines (clay lenses every 1-2 cm); grey and brown; moist, very dense.	SP		0.56 56.30						
	0	56.30 - 60.00 Sandy CLAY; blue-green; moist/w<PL, very stiff.	CH		-3.14						
60		60.00 - 70.00 Fine to coarse SAND; whitish-grey with some orange oxidation staining; moist, very dense. Occasional ~2cm clay lenses at 61', 61.4', 63' and 68.7'	SW		60.00 -13.14	S-7	DP		10.00 10.00		
	-5										
65											
	-10										
70		70.00 - 75.00 Fine to medium SAND with frequent ~1cm clay lenses; orange and light-grey; moist, very dense.	SP		70.00 -18.14	S-8	DP		10.00 10.00		
	-15										
75		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 110.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/24/19
DATE COMPLETED: 1/29/19

NORTHING: 6,883,377.83
EASTING: 11,831,452.65
GS ELEVATION: 56.86 ft
TOC ELEVATION: 59.86 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		75.00 - 78.50 Medium SAND with frequent thin clay lenses; blue-green; moist, very dense.	SP-SC		75.00	S-8	DP		10.00 10.00		
	-20				-21.64						
		78.50 - 78.80 CLAY; dark purple-grey; very stiff, w<PL.	CH		-21.94						
		78.80 - 79.50 Fine to medium SAND with frequent clay lenses; blue-green ; moist, very dense.	SP		78.80 -22.64						
80		79.50 - 80.50 CLAY with some fine sand; grey; very stiff. (Some fine to coarse rounded quartzite gravel at 80.5')	CH		79.50 -23.64						
		80.50 - 92.50 Fine to medium SAND with some high-plasticity fines; light grey; moist to wet, very dense.			80.50					Filter pack Seal (Bentonite grout)	
	-25										
85						S-9	DP		10.00 10.00		
	-30		SP							Filter pack (No. 2 Sand)	
										0.010" Slotted Screen	
90											
	-35				-35.64						
		92.50 - 99.00 CLAY with some fine sand; blue-green and brown; w<PL, very stiff to hard.			92.50					No. 2 Sand	
95			CH			S-10	DP		10.00 10.00		
	-40				-42.14						
		99.00 - 110.00 CLAY with trace fine sand; red-mottled brown from 99'-104', red from 104'-106, brown from 106'-110'; w<PL, very stiff to hard.	CH		99.00						
100		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 110.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/24/19
DATE COMPLETED: 1/29/19

NORTHING: 6,883,377.83
EASTING: 11,831,452.65
GS ELEVATION: 56.86 ft
TOC ELEVATION: 59.86 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
100		99.00 - 110.00 CLAY with trace fine sand; red-mottled brown from 99'-104', red from 104'-106, brown from 106'-110'; w<PL, very stiff to hard. *(Continued)*									
	-45									Bentonite Chips	
105			CH			S-11	DP		10.00 10.00		
	-50										
110					-53.14						
		Boring completed at 110.00 ft									
	-55										
115											
	-60										
120											
	-65										
125											

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4SB

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 50.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

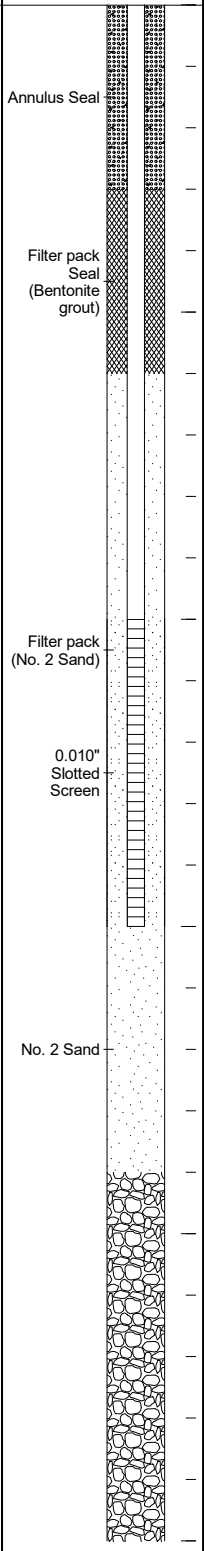
NORTHING: 6,884,325.84
EASTING: 11,830,333.88
GS ELEVATION: 56.70 ft
TOC ELEVATION: 59.83 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	ELEV. / DEPTH (ft)
0		0.00 - 0.50 [TOPSOIL] ORGANIC SILT; dark brown; moist.		56.20
	55	0.50 - 4.00 Sandy CLAY with trace fine gravel (rounded quartzite); light red-brown; w~PL, stiff.	CH	0.50 52.70
5	50	4.00 - 9.00 Fine to medium SAND and CLAY; alternating orange and green; w~PL, stiff.	SP/CH	4.00 47.70
10	45	9.00 - 13.00 Medium to coarse SAND with some plastic fines and trace fine gravel (rounded quartzite); yellow-brown; wet, compact.	SP	9.00 43.70
15	40	13.00 - 20.00 CLAY with some fine to coarse sand; green with red-brown mottling; w<PL, very stiff.	CH	13.00 36.70
20	35	20.00 - 28.50 CLAY with some fine to coarse sand and trace (rounded quartzite) gravel; grey-green with red-brown mottling; w<PL, very stiff.	CH	20.00
25		Log continued on next page		

NUMBER | TYPE | PID (ppm) | REC / ATT

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS / COMMENTS

WELL CASING
Interval: 0' - 50'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad: 3'X3'
Protective Casing: 4"x4"

ANNULUS SEAL
Interval: 0' - 3'
Type: concrete

FILTER PACK SEAL
Interval: 4' - 6'
Type: Hydrated

FILTER PACK
Interval: 6.0'-19.0'
Type: No. 2 Sand

WELL SCREEN
Interval: 10.0'-15.0'
Material: Polyvinyl Chloride (PVC)
Diameter: 2.0
Slot Size: 0.010"
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-4SB

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 50.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,325.84
EASTING: 11,830,333.88
GS ELEVATION: 56.70 ft
TOC ELEVATION: 59.83 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25	30	20.00 - 28.50 CLAY with some fine to coarse sand and trace (rounded quartzite) gravel; grey-green with red-brown mottling; w<PL, very stiff. *(Continued)*	CH		28.20						
		28.50 - 35.00 CLAY with some fine to medium sand and trace gravel; mostly red, with visible bedding structure; w<PL, very stiff.	CH		28.50 21.70					Bentonite Chips	
35	20	35.00 - 40.00 Sandy CLAY with some fine, angular gravel (broken from larger weakly cemented rock); grey; w<PL, very stiff.	CH		35.00 16.70						
40	15	40.00 - 43.00 Fine to coarse SAND with some high-plasticity fines; grey/olive color; very dense, moist.	SW-SC		40.00 13.70						
		43.00 - 47.00 Fine to medium CLAYEY SAND; blue-green; very dense, moist.	SC		43.00 9.70						
45	10	47.00 - 48.50 Fine to medium SAND with some high-plasticity fines; grey and yellow; very dense, moist.	SP-SC		47.00 8.20						
		48.50 - 50.00 CLAY and SAND; olive-yellow; w<PL, very stiff.	CH/SP		48.50 6.70						
50		Boring completed at 50.00 ft									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-5S

SHEET 1 of 4

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 90.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

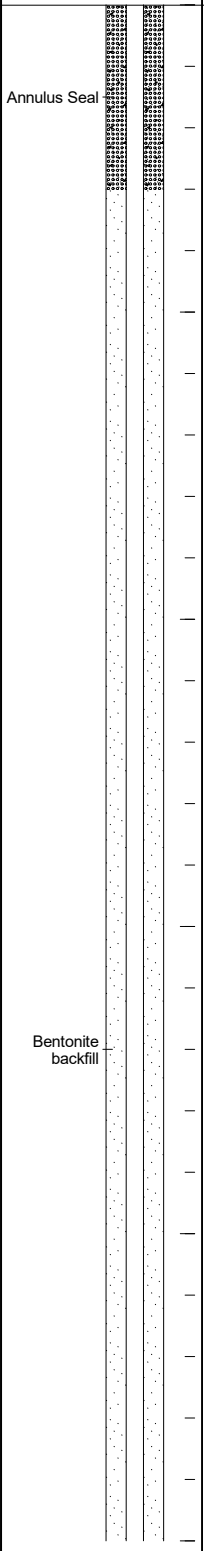
NORTHING: 6,884,325.83
EASTING: 11,830,334.16
GS ELEVATION: 33.27 ft
TOC ELEVATION: 36.36 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT
0		0.00 - 1.00 [TOPSOIL] ORGANIC SILT, dark brown; loose, moist.	OL		32.27				
		1.00 - 5.00 SANDY SILTY CLAY; light brown; w>PL, soft to firm.	CL		1.00				
5	30				28.27	S-1	DP		3.20 / 10.00
		5.00 - 14.00 Fine SAND and SILTY CLAY with trace organic and trace fine gravel; grey and orange (interbedded); firm, w>PL.	SP/CL		5.00				
10	25								
	20				19.27				
		14.00 - 19.00 SILTY CLAY and very fine SAND; alternating (1-2 cm) lenses of red and grey; stiff, w~PL.	CL/SP		14.00	S-2	DP		8.50 / 10.00
15	15				14.27				
		19.00 - 22.00 GRAVELLY SAND, sand medium to coarse, gravel fine to coarse (rounded quartzite); grey with red interval from 19.5'-20.0'; compact, wet.	SP		19.00				
20					11.27				
		22.00 - 22.30 SANDY GRAVEL, gravel fine to coarse; compact, wet.	GP		10.97				
		22.30 - 26.00 Medium SAND; grey; compact, moist to wet; a 2" clay lens at 24.5', with signs of oxidation and potential ancient wetland (orange/black staining)	SP		22.30	S-3	DP		9.30 / 10.00
25	10								

Log continued on next page

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS / COMMENTS

WELL CASING
Interval: 0'-43'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad: 3'x3'
Protective Casing: 4"x4"

ANNULUS SEAL
Interval: 0.0'-3.0'
Type: Concrete

FILTER PACK SEAL
Interval: 31.0'-33.0'
Type: Hydrated bentonite

FILTER PACK
Interval: 33.0'-48.0'
Type: No. 2 Sand

WELL SCREEN
Interval: 38.0'-43.0'
Material: Polyvinyl Chloride (PVC)
Diameter: 2.0
Slot Size: 0.010"
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-5S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 90.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,325.83
EASTING: 11,830,334.16
GS ELEVATION: 33.27 ft
TOC ELEVATION: 36.36 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25			SP		7.27						
		26.00 - 30.50 Fine to coarse SAND with some fine to coarse gravel; orange and grey; compact to dense, moist. Dark orange/red staining from 29.5'-30.5'.	SW		26.00	S-3	DP		9.30 10.00		
30					2.77						
		30.50 - 33.00 Medium to coarse SAND; grey; dense, moist to wet. Clay infilling (from potential burrow) at 31.0'	SP		30.50					Filter pack Seal (Bentonite grout)	
		33.00 - 33.30 SILTY CLAY with some medium sand (interbeds) and trace fine quartzite gravel; grey, with black/red staining; stiff.	CL		0.27 -0.03						
		33.30 - 43.00 Medium to coarse SAND; uniform grey; dense, moist to wet.	SP		33.30	S-4	DP		10.00 10.00	Filter pack (No. 2 Sand)	
					-9.73					0.010" Slotted Screen	
45		43.00 - 50.00 CLAY with some very fine sand; blue-grey and orange; very stiff, w<PL. Occasional very thin sand lenses.	CH		43.00	S-5	DP		10.00 10.00	No. 2 Sand	
					-16.73						
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-5S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 90.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,325.83
EASTING: 11,830,334.16
GS ELEVATION: 33.27 ft
TOC ELEVATION: 36.36 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		50.00 - 52.00 Sandy CLAY, sand very fine; blue-grey with orange mottling; w<PL, very stiff.	CH		50.00 -18.73						
		52.00 - 61.00 CLAY with some very fine sand; blue-grey; w<PL, very stiff.	CH		52.00	S-6	DP		10.00 10.00		
55	-20										
60	-25				-27.73						
		61.00 - 61.50 Very fine SAND with some high plasticity fines; dry, very dense.	SP-SC		61.00 -28.23						
		61.50 - 63.00 Very fine SAND and CLAY; brown-mottled blue-grey; w<PL, very stiff.	SP/CH		61.50 -29.73						
	-30	63.00 - 66.00 CLAYEY SAND, sand very fine-grained; blue-grey, very dense, dry.	SC		63.00 -32.73	S-7	DP		10.00 10.00		
65		66.00 - 70.00 Fine SAND with some plastic fines; very dense.	SP		66.00 -36.73					Bentonite Chips	
	-35										
70		70.00 - 71.00 Fine SAND with CLAY; blue-grey; w<PL, very stiff.	SP/CH		70.00 -37.73						
		71.00 - 72.00 CLAY with some fine sand; blue-grey; very stiff, w<PL.	CH		71.00 -38.73						
		72.00 - 72.50 CLAYEY SAND; blue-grey; very stiff.	SC		72.00 -39.23	S-8	DP		10.00 10.00		
	-40	72.50 - 80.00 CLAY; brown; very stiff to hard, w<PL.	CH		72.50						
75		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-5S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 90.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,325.83
EASTING: 11,830,334.16
GS ELEVATION: 33.27 ft
TOC ELEVATION: 36.36 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		72.50 - 80.00 CLAY; brown; very stiff to hard, w<PL. *(Continued)*									
	-45		CH			S-8	DP		10.00 10.00		
80					-46.73						
		80.00 - 90.00 Fine SAND; blue-green; dry, very dense.			80.00						
	-50										
85			SP			S-9	DP		10.00 10.00		
	-55										
90					-56.73						
		Boring completed at 90.00 ft									
	-60										
95											
	-65										
100											

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-6S

SHEET 1 of 3

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 60.00 ft
DRILL METHOD: Rotosonic

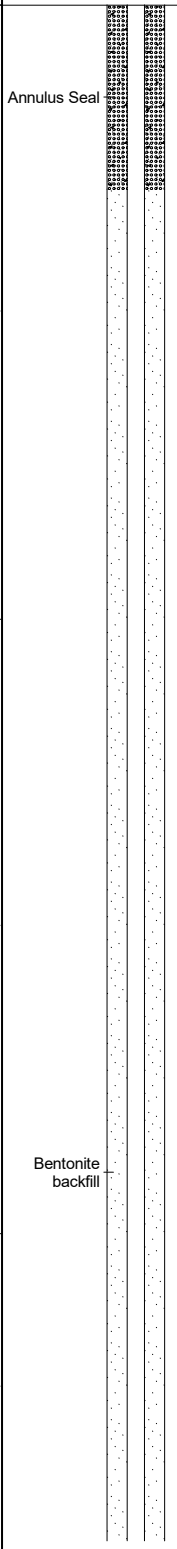
DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,662.82
EASTING: 11,829,674.01
GS ELEVATION: 34.58 ft
TOC ELEVATION: 37.52 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT
0		0.00 - 0.70 Coarse (R-3 riprap size) GRAVEL with silt and organics; dark brown; moist, loose to compact. [ROAD GRAVEL / TOPSOIL]	GM		33.88				
		0.70 - 6.00 Coarse GRAVEL with some organics and low plasticity fines; brown to dark brown; moist, very loose.	GP-GM		0.70 28.58	S-1	DP		3.80 10.00
5	30	6.00 - 10.00 Fine to medium SAND with trace fine, sub-rounded gravel; grey and orange-brown; moist, loose; occasional thin silt lenses.	SP		6.00 24.58				
10	25	10.00 - 12.50 Fine to medium SAND with trace fines; grey and orange-brown (with red oxidation staining between 10' and 11'); moist, compact; frequent 0.5" clay lenses .	SP		10.00 22.08				
15	20	12.50 - 20.00 Fine to medium SAND with trace fines; grey and orange-brown (with red oxidation staining between 10' and 11'); moist, compact.	SP		12.50 14.58	S-2	DP		5.00 10.00
20	15	20.00 - 25.00 Fine to medium SAND; alternating grey and orange (1-3 mm bedding intervals); moist, compact; contains tiny nodules of fine yellow-orange sand.	SP		20.00 9.58	S-3	DP		6.00 10.00
25	10	Log continued on next page							

MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES



WELL CONSTRUCTION DETAILS / COMMENTS

WELL CASING
Interval: 0'-40'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad: 3'x3'
Protective Casing: 4"x4"

ANNULUS SEAL
Interval: 0.0'-3.0'
Type: Concrete

FILTER PACK SEAL
Interval: 35.0'-37.0'
Type: Hydrated bentonite

FILTER PACK
Interval: 37.0'-53.0'
Type: No. 2 Sand

WELL SCREEN
Interval: 40.0'-50.0'
Material: Polyvinyl Chloride (PVC)
Diameter: 2.0
Slot Size: 0.010"
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE MW-6S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 60.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,662.82
EASTING: 11,829,674.01
GS ELEVATION: 34.58 ft
TOC ELEVATION: 37.52 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL / PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		25.00 - 30.00 Fine to medium SAND with trace fines (1-2 mm clay lenses) and trace rounded quartzite gravel; alternating grey and orange; moist, medium dense.	SP		25.00	S-3	DP		6.00 10.00		
	5				4.58						
30		30.00 - 35.00 Fine to medium SAND with trace fines; alternating grey and orange; moist, dense to very dense; 3-in thick clay lens at 35'.	SP		30.00	S-4	DP		10.00		
	0				-0.42						
35		35.00 - 36.00 Fine to medium SAND with some plastic fines; grey and orange; moist, very dense.	SP-SC		35.00 -1.42				10.00	Filter pack Seal (Bentonite grout)	
		36.00 - 36.70 CLAY; grey; w<PL, very stiff.	CL-CH		36.00 -2.12						
		36.70 - 40.00 Fine to medium SAND with trace high plasticity fines; grey and orange with oxide staining; moist to wet, very dense.	SP		36.70						
	-5				-5.42						
40		40.00 - 47.50 CLAY; dark grey; very stiff to hard	CH		40.00					Filter pack (No. 2 Sand)	
	-10					S-5	DP		10.00	0.010" Slotted Screen	
45									10.00		
		47.50 - 47.90 Medium SAND with some high plasticity fines; brown; moist to wet.	SP-SC		-12.92 -13.32						
		47.90 - 50.00 CLAY; dark grey; very stiff to hard	CH		47.90						
	-15				-15.42						
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE MW-6S

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 60.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/23/19
DATE COMPLETED: 1/23/19

NORTHING: 6,884,662.82
EASTING: 11,829,674.01
GS ELEVATION: 34.58 ft
TOC ELEVATION: 37.52 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		50.00 - 60.00 Fine to medium CLAYEY SAND; blue-grey; dry to moist, very dense.			50.00						
55	-20		SC			S-6	DP		10.00 10.00	No. 2 Sand Bentonite Chips	
60	-25				-25.42						
		Boring completed at 60.00 ft									
65	-30										
70	-35										
75	-40										

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: A. Apostolides
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/12/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,116.43
EASTING: 11,830,772.15
GS ELEVATION: 143.88 ft
TOC ELEVATION: 146.79 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
0		0.00 - 2.50 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, fill, CO, W<PL, hard.	ML		141.38 / 2.50						
		2.50 - 34.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, fill, NC, moist, loose.	ML			1	SOIL CORE		4.50 / 10.00		
5	140										
10	135					2	SOIL CORE		0.00 / 10.00		
15	130										
20	125					3	SOIL CORE		7.00 / 10.00		
25	120										

Log continued on next page

WELL CASING
Interval: 0'-95'
Material: PVC
Diameter: 2-inch
Joint Type: threaded

WELL COMPLETION
Pad: 3'x3'
Protective Casing: 4"x4"

ANNULUS SEAL
Interval: 0'-88'
Type: Bentonite Grout

FILTER PACK SEAL
Interval: 88'-90'
Type: 3/8" Bentonite Chip

FILTER PACK
Interval: 90'-110'
Type: No. 2 Sand

WELL SCREEN
Interval: 95'-105'
Material: PVC
Diameter: 2-inch
Slot Size: 0.01-inch
End Cap: PVC

DRILLING METHODS
Type: Rotosonic
Notes:

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/12/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,116.43
EASTING: 11,830,772.15
GS ELEVATION: 143.88 ft
TOC ELEVATION: 146.79 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE: DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		2.50 - 34.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, fill, NC, moist, loose. *(Continued)*	ML			3	SOIL CORE		7.00 / 10.00		
30	115										
	110				109.88						
		34.00 - 49.50 SUSPECTED BOTTOM ASH (SM) SILTY SAND, medium to coarse sand, poorly graded, some silt, trace angular gravel, dark gray, fill, NC, wet to saturated, very loose.			34.00	4	SOIL CORE		6.00 / 10.00		
35											
40	105		SM			5	SOIL CORE		7.00 / 10.00	Bentonite Grout	
45	100										
	95				94.38						
50		Log continued on next page	SM		49.50						

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/12/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,116.43
EASTING: 11,830,772.15
GS ELEVATION: 143.88 ft
TOC ELEVATION: 146.79 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		49.50 - 52.00 SUSPECTED BOTTOM ASH (SM) medium to coarse sand, poorly graded, some silt, trace angular gravel, dark gray, thin gray fly ash laminations, fill, NC, wet to saturated, very loose. *(Continued)*	SM		91.88						
		52.00 - 70.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, fill, NC, wet to saturated, very loose.	ML		52.00	6	SOIL CORE		7.00 / 10.00		
55	90										
60	85					7	SOIL CORE		1.00 / 10.00		
65	80										
70	75	70.00 - 75.00 SUSPECTED BOTTOM ASH (SM) SILTY SAND, medium to coarse sand, poorly sorted, some silt, trace angular ravel, dark gray, fill, NC, wet, very loose.	SM		73.88 70.00	8	SOIL CORE		7.00 / 10.00		
75	70				68.88						

Log continued on next page

LOG SCALE: 1 in = 3.13 ft
DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/12/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,116.43
EASTING: 11,830,772.15
GS ELEVATION: 143.88 ft
TOC ELEVATION: 146.79 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		75.00 - 77.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, fill, NC, wet, loose.	ML		75.00 66.88						
		77.00 - 90.00 SUSPECTED FLY ASH and NATIVE MIXED LAYER (ML) SILT, some fine sand, some angular gravel, dark gray and brownish yellow, fill, CO, W>PL, firm.			77.00	8	SOIL CORE		7.00/10.00		
80	65										
			ML								
85	60					9	SOIL CORE		5.00/10.00		
	55				53.88					3/8" Bentonite Chip	
90		90.00 - 110.00 SUSPECTED MIXED ASH (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, dark gray, fill, NC, moist, loose.			90.00						
	50										
95			SM			10	SOIL CORE		3.00/10.00		
	45									No. 2 Sand	
100		Log continued on next page								0.01-inch	

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE PZ-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 120.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/12/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,116.43
EASTING: 11,830,772.15
GS ELEVATION: 143.88 ft
TOC ELEVATION: 146.79 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
100		90.00 - 110.00 SUSPECTED MIXED ASH (SM) SILTY SAND, fine to medium sand, poorly sorted, some silt, dark gray, fill, NC, moist, loose. *(Continued)*	SM		33.88	11	SOIL CORE		3.00 / 10.00	Screen	
105	40									No. 2 Sand	
110	35	110.00 - 117.00 (SC) CLAYEY SAND, medium sand, poorly sorted, some clay, yellowish brown, native, CO, moist, compact.	SC		110.00 26.88	12	SOIL CORE		7.00 / 10.00	3/8" Bentonite Chip	
115	30										
120	25	117.00 - 120.00 (CL) SILTY CLAY, yellowish brown, native, CO, W>PL, hard.	CL		117.00 23.88						
125	20	Boring completed at 120.00 ft Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE PZ-2

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/13/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,577.34
EASTING: 11,830,828.00
GS ELEVATION: 154.80 ft
TOC ELEVATION: 157.70 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
0		0.00 - 8.50 SUSPECTED FLY ASH (ML) SILT, trace angular gravel and medium sand, dark gray, fill, CO, moist, compact.	ML		146.30	1	SOIL CORE		6.50 / 10.00		**WELL CASING** Interval: 0'-65' Material: PVC Diameter: 2-inch Joint Type: threaded **WELL COMPLETION** Pad: 3'x3' Protective Casing: 4"x4" **ANNULUS SEAL** Interval: 0'-58' Type: Bentonite Grout **FILTER PACK SEAL** Interval: 58'-60' Type: 3/8" Bentonite Chip **FILTER PACK** Interval: 60'-80' Type: No. 2 Sand **WELL SCREEN** Interval: 65'-75' Material: PVC Diameter: 2-inch Slot Size: 0.01-inch End Cap: PVC **DRILLING METHODS** Type: Rotosonic Notes:
5	150										
		8.50 - 10.00 SUSPECTED FLY ASH and FILL (ML) SILT, trace fine sand, yellowish brown and dark gray, fill, CO, W>PL, stiff.	ML		8.50 144.80						
10	145	10.00 - 17.50 SUSPECTED FLY ASH (ML) SILT, trace angular gravel and fine sand, dark gray, fill, CO, W~PL, stiff.	ML		10.00 137.30	2	SOIL CORE		5.00 / 10.00		
15	140										
		17.50 - 18.00 SUSPECTED FLY ASH (ML) SILT, light gray, fill, NC, dry, loose.	ML		17.50 136.80						
		18.00 - 37.00 SUSPECTED FLY ASH (ML) SILT, trace angular gravel and fine sand, dark gray, fill, W~PL, stiff.			18.00						
20	135		ML			3	SOIL CORE		7.50 / 20.00		
25	130										

Log continued on next page

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-2

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/13/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,577.34
EASTING: 11,830,828.00
GS ELEVATION: 154.80 ft
TOC ELEVATION: 157.70 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		18.00 - 37.00 SUSPECTED FLY ASH (ML) SILT, trace angular gravel and fine sand, dark gray, fill, W~PL, stiff. *(Continued)*	ML			3	SOIL CORE		7.50 20.00	Bentonite Grout	
30	125										
35	120				117.80 37.00						
40	115	37.00 - 43.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, NC, moist, loose.	ML								
45	110	43.00 - 68.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, NC, saturated, very loose.	ML		111.80 43.00	4	SOIL CORE		14.00 20.00		
50	105	Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-2

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/13/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,577.34
EASTING: 11,830,828.00
GS ELEVATION: 154.80 ft
TOC ELEVATION: 157.70 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		43.00 - 68.00 SUSPECTED FLY ASH (ML) SILT, trace fine sand, dark gray, NC, saturated, very loose. *(Continued)*									
55	100		ML			4	SOIL CORE		14.00 20.00	3/8" Bentonite Chip	
60	95										
65	90					5	SOIL CORE		15.00 20.00	No. 2 Sand	
					86.80						
		68.00 - 75.00 SUSPECTED MIXED ASH (SM) SILTY SAND, fine to medium sand, some silt, dark gray, fill, NC, saturated, loose.			68.00						
70	85		SM							0.01-inch Screen	
75	80				79.80						
		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE PZ-2

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 2/13/19
DATE COMPLETED: 2/13/19

NORTHING: 6,886,577.34
EASTING: 11,830,828.00
GS ELEVATION: 154.80 ft
TOC ELEVATION: 157.70 ft

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75		75.00 - 80.00 SUSPECTED FLY ASH and NATIVE MIXING LAYER (ML) silt, fine sand, poorly sorted, trace angular gravel, dark gray and yellowish brown, CO, W~PL, firm.	ML		75.00	5	SOIL CORE		15.00 20.00	No. 2 Sand	
80	75				74.80						
		80.00 - 94.00 (SC) CLAYEY SAND, fine to medium sand, poorly sorted, yellowish brown, NC, moist, compact.	SC		80.00						
85	70										
90	65					6	SOIL CORE		7.00 20.00	3/8" Bentonite Chip	
					60.80						
		94.00 - 100.00 (CL) SILTY CLAY, some silt, trace angular gravel, yellowish brown, CO, W<PL, very stiff.			94.00						
95	60		CL								
100	55	Log continued on next page			54.80						
		Boring completed at 100.00 ft									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

BOREHOLE RECORD W/ PID SAMPLE RECOVERY 2019-01-30 THROUGH 2019-02-14 POSSUM POINT ACM BORING LOGS UPDATED.GPJ ENVIRONMENTAL DATA TEMPLATE.GDT 6/17/19

RECORD OF BOREHOLE SB-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/30/19
DATE COMPLETED: 2/4/19

not surveyed
GS ELEVATION: 22.00 ft
TOC ELEVATION:

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES
0		0.00 - 0.50 TOPSOIL, fine sand, some silt, some fibrous organics, dark brown, native, NC, moist, loose.	SM		21.50 0.50					
	20	0.50 - 4.50 (SM) SILTY SAND, fine sand, some silt, orange and gray, native, NC, moist, compact.	SM							
					17.50					
5		4.50 - 10.00 (SM) SILTY SAND, fine sand, tan with orange nodules, native, NC, moist, compact.	SM		4.50	1	SOIL CORE		5.75 10.00	
	15									
10					12.00					
		10.00 - 11.75 (SW) SAND, medium to coarse sand, well graded, tan with sporadic orange staining, native, NC, dry very loose.	SW		10.00 10.25					
	10	11.75 - 20.00 (SM) SILTY SAND, fine to medium sand, trace angular gravel, green with orange nodules, native, NC, moist, compact.	SM		11.75	2	SOIL CORE		2.50 10.00	
15										
	5									
20					2.00					
		20.00 - 23.00 (SW) SAND, medium to coarse, well graded, tann with sporadic orange staining, native, NC, dry, very loose.	SW		20.00 -1.00	3	SOIL CORE		6.50 10.00	
	0	23.00 - 26.00 (SM) SILTY SAND, fine to coarse sand, some silt, tan with orange staining, native, NC, moist, loose.	SM		23.00					
25		Log continued on next page								

WELL CASING
Interval: N/A
Material: N/A
Diameter: N/A
Joint Type: N/A

WELL COMPLETION
Pad:
Protective Casing:

ANNULUS SEAL
Interval: N/A
Type: N/A

FILTER PACK SEAL
Interval: N/A
Type: N/A

FILTER PACK
Interval: N/A
Type: N/A

WELL SCREEN
Interval: N/A
Material: N/A
Diameter: N/A
Slot Size: N/A
End Cap: N/A

DRILLING METHODS
Type: Rotosonic
Notes:

WELL NOTES:
Boring was abandoned after drilling with 3/8" bentonite chip.

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE SB-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/30/19
DATE COMPLETED: 2/4/19

not surveyed
GS ELEVATION: 22.00 ft
TOC ELEVATION:

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
25		23.00 - 26.00 (SM) SILTY SAND, fine to coarse sand, some silt, tan with orange staining, native, NC, moist, loose. *(Continued)*	SM		-4.00						
		26.00 - 33.50 (GM) sandy SILTY GRAVEL, coarse angular to subrounded gravel, medium to coarse sand, some silt, tan and brown, abundant quartz, native, NC, saturated, very loose.	GM		26.00	3	SOIL CORE		6.50 10.00		
30	-5				-11.50						
	-10	33.50 - 36.00 (SM) SILTY SAND, fine to medium sand, some silt, green, native, NC, moist, compact.	SM		33.50	4	SOIL CORE		10.00 10.00		
35		36.00 - 40.00 (SM) SILTY SAND, fine to medium sand, some silt, alternating bands of orange and green, micaceous, native, NC, moist, dense.	SM		-14.00 36.00						
	-15				-18.00						
40		40.00 - 46.00 (GM) sandy SILTY GRAVEL, coarse subangular to subrounded gravel, medium to coarse sand, some silt, brown, native, NC, wet to saturated, very loose.	GM		40.00	5	SOIL CORE		8.00 10.00		**WELL NOTES:** Boring was abandoned after drilling with 3/8" bentonite chip.
	-20				-24.00						
45		46.00 - 50.00 (CL) sandy SILTY CLAY, fine to medium sand, some silt, green micaceous, native, CO, W<PL, very stiff.	CL		46.00						
	-25				-28.00						
50		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE SB-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/30/19
DATE COMPLETED: 2/4/19

not surveyed
GS ELEVATION: 22.00 ft
TOC ELEVATION:

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
50		50.00 - 55.00 (GM) sandy SILTY GRAVEL, coarse subangular to subrounded gravel, medium to coarse sand, some silt, brown and green, native, NC, wet to saturated, very loose.	GM		50.00						
	-30										
55					-33.00	6	SOIL CORE		10.00		
		55.00 - 60.00 (SW) SAND, medium to coarse, well graded, green, native, NC, moist, loose.	SP		55.00				10.00		
	-35										
60					-38.00						
		60.00 - 62.00 (GM) sandy SILTY GRAVEL, coarse subrounded gravel, medium to coarse sand, well graded, some silt, green and brown, native, NC, moist, loose.	GM		60.00						**WELL NOTES:** Boring was abandoned after drilling with 3/8" bentonite chip.
	-40				-40.00						
		62.00 - 70.00 (SP) SAND, medium to coarse, poorly graded, trace subrounded gravel, green, native, NC, moist, loose.	SP		62.00	7	SOIL CORE		10.00		
65									10.00		
	-45										
70					-48.00						
		70.00 - 72.50 (SP) gravelly SAND, medium to coarse, poorly graded, some subrounded gravel, green, native, NC, moist, loose.	SP		70.00						
	-50				-50.50	8	SOIL CORE		10.00		
		72.50 - 75.50 (CL) SILTY CLAY, some medium to coarse green sand, dark brown with sporadic red mottling, native, CO, W<PL, hard.	CL		72.50				10.00		
75		Log continued on next page									

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

RECORD OF BOREHOLE SB-1

PROJECT: Possum Point Power Station ACM
PROJECT NUMBER: 1662150.2002
DRILLED DEPTH: 100.00 ft
DRILL METHOD: Rotosonic

DRILL RIG: Geoprobe 8150LS
DATE STARTED: 1/30/19
DATE COMPLETED: 2/4/19

not surveyed
GS ELEVATION: 22.00 ft
TOC ELEVATION:

DEPTH W.L.:
ELEVATION W.L.:
DATE W.L.:
TIME W.L.:

DEPTH (ft)	ELEVATION (ft)	DESCRIPTION	USCS	GRAPHIC LOG	ELEV. / DEPTH (ft)	NUMBER	TYPE	PID (ppm)	REC / ATT	MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS / COMMENTS
75			CL		-53.50	8	SOIL CORE		10.00 / 10.00		**WELL NOTES:** Boring was abandoned after drilling with 3/8" bentonite chip.
		75.50 - 79.00 (SP) SAND, medium to coarse, poorly graded, trace gravel, green, native, NC, moist, compact.	SP		75.50						
	-55				-57.00						
		79.00 - 100.00 (SC) CLAYEY SAND, medium to coarse sand, poorly sorted, homogenous, trace gravel, green and gray, native, semi-cohesive, moist, compact.			79.00						
80						9	SOIL CORE		10.00 / 10.00		
	-60										
85											
	-65										
90			SC			10	SOIL CORE		10.00 / 10.00		
	-70										
95											
	-75										
100		Boring completed at 100.00 ft			-78.00						

LOG SCALE: 1 in = 3.13 ft

DRILLING COMPANY: GEOlogic Exploration
DRILLER: A. Gloege

PREPARED: C. Joyner
REVIEWED: J. Kelly
DATE: 3/22/19

GOLDER

APPENDIX B

GROUNDWATER MONITORING WELL CONSTRUCTION SPECIFICATIONS
WELL DEVELOPMENT GUIDANCE
WELL DECOMMISSIONING GUIDANCE

GROUNDWATER MONITORING WELL CONSTRUCTION SPECIFICATIONS

1.0 DRILLING

1.1 Nominal Boring Diameter

In all cases where the diameter of the well pipe will be 2 inches, the minimum nominal borehole diameter of borings advanced through soil materials will be 6 inches in order to help ensure that the minimum width of the annulus around the well pipe will be 2 inches.

1.2 Drilling Methods

Boring should be advanced with drilling technology appropriate for the subsurface conditions at the site.

1.3 Cuttings

Drilling will be performed in a manner that minimizes the spreading of soil cuttings. Disposition of cuttings upon project completion will be the responsibility of Owner/Operator or the Owner/Operator's designated representative. Cuttings will be disposed of in accordance with the DEQ's Investigative Derived Waste Disposal Policy.

2.0 SOIL SAMPLING

2.1 Cuttings

During borehole drilling, the driller will attempt to sample the soil cuttings by providing samples of the cuttings at intervals specified by the Owner/Operator or the Owner/Operator's representative. The driller will keep cuttings clear of the borehole.

2.3 Sample Disposition

Disposition of sample material upon completion of the project will be the responsibility of the Owner/Operator or the Owner/Operator's designated representative.

3.0 WELL CONSTRUCTION

3.1 Well Pipe and Screen

Each monitoring well will be constructed of pre-cleaned Schedule 40 PVC pipe having an inner diameter of 2 inches.

The base of each well will terminate with a screen 10 feet in length unless otherwise requested by the client or regulatory agency or dictated by geologic conditions. Screens will be factory-slotted. Slots will be 0.01 inch in width.

The driller will wear clean surgical-type gloves whenever handling PVC well pipe, and the pipe will be maintained in a clean manner.

In order to provide a clean cut, a PVC pipe cutter will be used whenever it is necessary to shorten sections of the PVC well pipe; a hacksaw will not be used.

3.3 Sand Pack

Filter sand will be a clean sand of proper size in relation to the screen slots to prevent its passage into the well, with no fraction coarser than 0.25-inch nominal diameter.

Filter sand will be placed in the annulus around the well riser and to a point approximately 2 feet above the top of the screen. A tremie pipe will be used as feasible.

3.4 Bentonite Seal

The annulus around the well pipe will be sealed with a layer of bentonite pellets, to be placed directly above the sand filter pack. The minimum thickness of the bentonite layer will be approximately two feet. The bentonite pellets should ideally be allowed 24 hours for hydration prior to continuing with well construction. A tremie pipe will be used as feasible

3.5 Grout

Following hydration of the bentonite seal, each boring will be sealed with a Portland Type I bentonite/cement slurry, using the tremie pipe method or a bentonite slurry grout if required by the project.

Bentonite content in the cement slurry will be 2 to 5 percent by weight to help reduce shrinkage.

3.6 Surface Completion

The driller will be prepared for either manhole or stickup surface completions.

In the case of manhole installations, suitable surface completion will consist of capped PVC riser and steel manhole.

The PVC riser will be provided with a lockable, watertight, expansion cap. The driller will provide a lock for each cap. All locks will be keyed identically and all keys relinquished to the owner.

The manhole will be placed in a manner that permits surface water to runoff and drain away from the manhole cover.

In the case of stickup installations, suitable surface completion will consist of a concrete apron, capped PVC well riser, and outer protective casing. The apron will be constructed in such a manner that surface water will not return to it.

The concrete apron will have the following minimum dimensions: 3 feet x 3 feet x 3.5 inches, and will be centered with respects to the riser. A form will be used in constructing the apron. The form will be centered with respect to the PVC riser. The upper surface of the apron will be graded to provide drainage away from the PVC riser. A spike will be set into the pad for surveying purposes.

The inner PVC riser (well pipe) will extend to an approximate height of 1.75 feet above the top of the concrete pad. A vent hole having a diameter of 0.25 inches will be drilled through the PVC riser at a point 2 inches below its top. Shavings generated by drilling the PVC riser will be prevented from falling into the well. The PVC riser will be provided with a slip on PVC cap.

The outer protective casing will be constructed of steel pipe having a diameter, or diagonal, of not less than 8 inches. The top of the outer protective casing, when uncovered, will be placed at a point between 0.5-inch above the top of the PVC well pipe and 0.5-inch below the top of the PVC pipe. A drain hole having a diameter of 0.5-inch will be drilled through the outer protective casing near the top of the concrete apron. Shavings generated by drilling the steel casing will be prevented from falling into the well. The casing will be marked for surveying purposes.

The outer protective casing will be lockable. The driller will provide a lock for each protective casing cap. All locks will be keyed identically.

4.0 SURVEYING

A licensed surveyor will survey well elevation. Survey point(s) will include:

- concrete pad (marked with a spike);
- outer protective steel casing, when open (engraved mark);
- inner PVC well pipe (engraved mark);
- ground surface (not marked);
- well location to within $\pm$ 0.5 foot in horizontal plane;
- ground surface elevation to within $\pm$ 0.01 foot;

- surveyor's pin elevation on concrete apron within ± 0.01 foot;
- top of monitoring well casing elevation to within ± 0.01 foot; and,
- top of protective steel casing elevation to within ± 0.01 foot.

5.0 WELL DEVELOPMENT AND INSPECTION

The driller will develop each well until sediment free water with stabilized field constituents (i.e., temperature, pH and specific conductance) is obtained.

Development will be conducted using a surge block followed by pumping or bailing. The surge block may be used as a means of assessing the integrity of the well screen and riser.

In the event a pump is employed, the design of the pump will be such that any groundwater that has come into contact with air is not allowed to drain back into the well. Air surging will not be used.

All well development equipment (bailers, pumps, surge blocks) and any additional equipment that contacts subsurface formations will be decontaminated prior to on site use, between consecutive on site uses, and/or between consecutive well installations, as directed by Owner/Operator or Owner/Operator's designated representative.

6.0 ANCILLARY REQUIREMENTS

6.1 Extraneous Material

The driller will take all reasonable care to ensure that each boring is free from all materials other than those required for well construction. Materials required for well construction is here defined to include polyvinyl chloride (PVC), sand, bentonite, Portland cement and natural soil materials. All other materials accidentally or purposely placed in the hole will be removed by driller prior to well completion.

6.2 Decontamination

All drilling equipment (drill steel, bits, casing materials) and any additional equipment, that contacts subsurface formations will be decontaminated prior to on site use, between consecutive on site uses, and/or between consecutive well installations, as directed by Owner/Operator or Owner/Operator's designated representative.

Appropriate decontamination procedure will consist of steam cleaning with potable water and biodegradable detergent (e.g., Liquinox) approved by Owner/Operator

or Owner/Operator's designated representative. Steam cleaning will be conducted in a manner that minimizes over-spray and runoff.

6.3 Disposition of Waste Water

If drilling fluids are used or monitoring wells constructed in an area of suspected contamination, well development wastewater will be placed in 55-gallon drums at the well site and subsequently transported to a publicly operated treatment works (POTW) or the sites leachate collection system for disposal.

6.4 Site Safety Plan

The driller is responsible for maintaining the personal safety of his employees while on site. The driller will keep a fire extinguisher (in good working condition) and first aid kit at the site at all times during which his employees occupy the site.

The driller will be responsible for providing any personal protective equipment that might be required by state and federal occupational safety and health agencies, including, but not necessarily limited to, hard hats, hearing protection and steel-toed boots, for all personnel employed by the driller.

6.5 Cleanup

The driller will be responsible for removing all refuse from each well site. Such refuse typically includes, but is not limited to, PVC pipe wrappers, sand bags, bentonite bags, cement bags, beverage containers, food wrappers and other forms of litter. Smoking on site will not be permitted.

The driller will be responsible for providing the following information to the Owner/Operator's designated representative after well installation has been performed:

- date and time of construction;
- drilling method and fluid used (if applicable);
- boring diameter;
- well pipe (inner casing) specifications;
- well depth (+/-0.01 ft.);
- drilling/lithologic logs;
- specifications for other casing materials (if applicable);
- screen specifications;
- well pipe/screen joint type;
- filter pack specifications (material, size);
- filter pack volume and calculations;
- filter pack placement methods;

- bentonite seal specifications;
- bentonite seal volume;
- bentonite seal placement method;
- grout specifications;
- grout volume;
- grout placement method;
- surface completion specifications; and
- well development procedure

7.0 WELL CONSTRUCTION AND SOIL BORING LOGS

In accordance with 9VAC-20-81-250-A.3.g of the Virginia Solid Waste Management Regulations or other applicable regulations, certified copies of well construction and soil boring logs will be forwarded to the DEQ following completion of well construction activities.

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WELL DEVELOPMENT PROCEDURES

- Record the static water level in the well.
- If a pump is present in the well, remove the pump from the well and measure the total depth of the well.
- Calculate saturated volume of the well and filter pack.
- Using a disposable bailer, collect a water sample from the top of the water column and record field measurements of water quality parameters (Water Quality Parameters (WQP): turbidity, pH, temperature, and specific conductance).
- Surge the well with the teflon surge block or large diameter weighted bailer for three to five minutes.
- Remove the surging device and purge the well with a pneumatic well development pump at a rate that is greater than the natural recharge rate of the well.
- Containerize all purge water for disposal at the location designated by the site.
- Record measurements of WQP on development logs following the removal of each consecutive well and filter pack volume.
- Continue purging until the turbidity level stabilizes or is reduced to less than 5 NTU, then repeat surging with surge block. Surging and purging are to be continued for a minimum of 4 hours, or until turbidity levels following a surging event are less than 10 NTU.
- If the well purges dry, record the rate of recharge and continue purging and surging activities after the well has recovered. Reduce the purge rate to slightly less than the natural recharge rate of the well.
- All non-disposable equipment that will be placed inside of the well during the development process will be decontaminated prior to each day's use using a phosphate-free detergent followed by a deionized water rinse.
- Purge water should be disposed of in a manner that is consistent with the Virginia Department of Environmental Quality's Investigative Derived Waste Disposal Policy.

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1.0 STANDARD OVERVIEW

This Standard represents recommended procedures for decommissioning monitoring wells at solid waste facilities. All wells (monitor wells, water supply wells, etc.) and piezometers not actively being used for their intended purpose and with no future plan for utilization should be decommissioned. Wells and piezometers represent potential conduits for cross-contamination through annulus transfer, improper construction, corrosion, accidents and vandalism. Proper decommissioning eliminates the potential for cross-contamination. In addition to the threat of cross-contamination, improperly decommissioned wells can pose a threat to the integrity of future baseliners. In expansion areas over unconsolidated material, unless the well casing is removed and replaced with a flexible grout, the casing can damage the baseliner in the event of differential settlement or subsidence. The weight of the overlying waste mass often causes a limited amount of subsidence, especially in fine-grained deposits. Since future expansions can occur in areas not currently foreseen, all unused wells within the vicinity of a solid waste disposal facility should be abandoned in accordance with this Standard.

The following well decommissioning procedures are designed to ensure that well materials (including cement grout) will not cause damage to liner materials in the event of subsidence and to minimize the potential for contaminant migration through annular materials. Where regulatory requirements conflict with the procedures described herein, approval should be sought to adhere to this Standard. The procedures described in this Standard generally meet or exceed most regulatory requirements. Possible reasons for variation to this Standard include, but are not limited to, unusual site hydrogeologic conditions, deep wells (>100 feet), multiple cased monitor wells or larger diameter wells (>4”), driven casing wells and State-specific well decommissioning requirements that differ from this Standard.

The goal of well decommissioning is to remove all borehole components including the existing grout and gravel pack and replace the borehole contents with a suitable grout mixture. Removal of all borehole components is best accomplished by overdrilling the well using an auger of a diameter 1.25 times that of the original borehole coupled with a centering device.

This standard was developed in consideration of the following reference materials:

- ASTM D 5299-99, 2005. Standard Guide for Decommissioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities. ASTM 1993 Annual Book of Standards, vol. 04.08, pp. 1318-1333.
- AWWA/ANSI A100-06, 2006. AWWA Standard for Water Wells, American Water Works Association, Denver Colorado. Appendix G.
- Lutenegger, A.J. and DeGroot, D.J. 1993, Hydrologic properties of contaminant transport barriers as borehole sealants. Hydraulic conductivity and Waste Contaminant Transport in Soils, ASTM STP 1142, D.E. Daniel and S.J. Trautwein, eds., ASTM Philadelphia, Pennsylvania.
- NWWA, 1975 (National Water Well Association Committee on Water Well Standards, 1975) Manual of Water Well Construction Practices, EPA –570/9-75-001. Office of Water Supply, Washington D.C.
- Smith, S.A., 1994, Well & Borehole Sealing, S.A. Smith Consulting Services, Ada, Ohio with Wisconsin Water Well Association for Groundwater publishing Co., Dublin, Ohio, 69p.

2.0 SURVEY CONTROL

Unless detailed survey information exists, each well shall be surveyed for both horizontal and vertical control, prior to decommissioning. The location of the well shall be surveyed to the nearest 0.5 feet. The ground surface elevation and top of well casing shall also be surveyed to the nearest 0.1 feet and 0.1 feet, respectively, relative to mean sea level. A State-licensed surveyor shall perform surveying.

3.0 GROUT SPECIFICATIONS

The following are specifications for three grout mixtures commonly used in well decommissioning and referenced throughout this Standard:

1. Neat cement grout - a mixture in the proportion of 94 pounds of Portland cement and not more than six gallons of water. Used to decommission wells completed in competent bedrock formations.
2. Neat Bentonite grout - a mixture in the proportion of 94 pounds of Portland cement and not more than six gallons of water, with bentonite up to five percent by weight of cement (between 3 and 4.7 pounds of bentonite per 94 pounds of Portland cement). Used to decommission wells completed in competent bedrock formations.
3. High solids bentonite grout - a mixture of water and a minimum of 30 percent by weight of bentonite (see discussion below), with no additives (minimum of 2.5 pounds of bentonite per gallon of water). Used to decommission wells completed in unconsolidated materials and competent rock, where appropriate.

Typically, a high solids grout can be prepared using granular bentonite and pumped at a relatively low-viscosity state if done quickly (within 15 minutes). This is due to the slower hydration of the granular bentonite as compared to powdered bentonite. However, if these timeframes cannot be achieved or if it is desirable to have a slower "set," an alternative is to use what has been termed the "Ohio mix". The "Ohio mix" involves preparing a low-solids bentonite grout slurry (30 to 50lbs/100 gallons of water) using API 200-mesh bentonite (e.g., Natural Gel, Gold Seal), into which 125 lb. of granular bentonite (8 to 20-mesh) is added and mixed (stirred). The hydrated bentonite in the slurry delays hydration of the granular bentonite without the addition of polymers or other agents. The result is a high solids bentonite grout at a viscosity that is feasible to pump with reasonable working time (Eidil et al. 1992 from Smith, 1994).

3.1 Cement

The cement shall be Portland Cement® Type 1 in accordance with ASTM C150, Type 1 or API-10A, Class A.

3.2 Water

Water shall be obtained from an approved source. Water used for down-hole purposes shall have a Total Dissolved Solids (TDS) concentration of less than 500 mg/L (Smith, 1994) and be certified free from contaminants, or sampled for volatile organic compounds by EPA method 8260.

3.3 Bentonite

Bentonite shall be an additive free granular sodium bentonite (Benseal, Enviroplug, PDS Granular, Volclay Crumbles or equivalent) generally 8 to 20 mesh particle size. Use of granular bentonite *in lieu* of powdered bentonite allows the placement of a high-solids grout with relatively low viscosity, if mixing and pumping are done quickly. If following the "Ohio mix" discussed above, additive free API 200-mesh bentonite is used for the initial slurry (e.g., Natural Gel, Gold Seal) into which granular bentonite (8 to 20 mesh) is added and mixed.

3.4 Grouting Equipment

Grout mixers shall be paddle or blade type capable of thoroughly mixing grout. All grouting lines (i.e., hoses, pipes, drill rods, etc.) shall have an inside diameter of at least 0.50 inches to prevent clogging. Grout pumps shall be of a positive displacement or progressive cavity type (Moyno) capable of delivering a minimum pressure of 20 psi. Venturi mixing and centrifugal pumps are less desirable alternatives due to clay particle shearing and clogging problems, respectively.

4.0 DECOMMISSIONING PROCEDURES

Decommissioning procedures must be tailored to each well type and geologic environment. The broad range of suitable decommissioning methods for different situations is covered in detail in ASTM D5299-99 and the above referenced standards and literature. The purpose of this standard is to establish minimum requirements for the most common well construction types at our facilities. For landfill facilities, the most common type of well installation consists of single cased wells installed in unconsolidated material at relatively shallow depths (i.e., < 100 feet). The procedures described herein can be used to decommission two-inch or four-inch diameter single cased PVC or steel wells installed at depths generally less than 100 feet. Other less common well types requiring specialized procedures and materials include large diameter wells, multiple cased wells and driven casing wells.

The goal of decommissioning is to completely remove all well materials either through overdrilling or pulling of the well or casing. Once all well materials have been removed, the resulting borehole can be properly sealed with a suitable grout mixture.

In general, a high solids bentonite grout mixture (30% by weight) is preferred for most well decommissioning projects. State regulations often stipulate that for wells installed in bedrock, non-flexible grout mixtures must be used, such as neat cement grout or neat bentonite grout. Non-flexible grout mixtures more closely match the physical characteristics of competent bedrock. For all wells or portions of wells completed in unconsolidated material a high solids bentonite grout as defined above is the requisite grouting material. For wells of portions of wells completed in competent bedrock grouting materials can be either of the three grout types specified above with preference given to high solids bentonite grout.

The following are specific decommissioning procedures. These steps shall generally be completed in the order listed below.

1. Ensure that adequate survey control exists for each well and obtain a copy of the original well construction log.
2. Well decommissioning drilling equipment, augers, water level marker, and other tools must be decontaminated before being brought to the site.
3. The depth of the well shall be measured and compared to the anticipated well depth to determine if any obstructions are in the well. If the well is obstructed, the obstruction will be removed prior to sealing the well, if possible.
4. Expected grout volume calculations shall be completed using the depth information derived from Steps 1 and 3. The expected volume shall be recorded for reconciliation with the final grout volumes used.
5. Remove the protective casing. Position the drill rig directly over the well and attach a chain to the outer protective casing. Pull directly upward on the protective casing. Often for shallow wells this procedure will also pull up the inner-casing and annular materials. If this occurs, continue to pull all well materials out, as practicable.

6. Remove the well casing and associated annular materials. Typically, removal is accomplished through overdrilling using a Hollow Stem Auger (HSA) drill rig equipped with an auger bit that exceeds the diameter of the original bit (1.25 times the original auger diameter) used to construct the well. The key to successful overdrilling is insuring the auger bit remains centered on the well for the duration of overdrilling. For wells constructed of PVC, either employ a pilot bit to insure centering is maintained or place A-rod (steel rod) throughout the length of the well to act as a guide during overdrilling. A pilot bit consists of an elongate pointed pin with a maximum diameter slightly less than that of the inner well casing. For wells constructed of steel materials, the steel casing itself can be used to maintain centering during overdrilling. Essentially, an auger is selected with an inner diameter slightly larger than the diameter of the steel casing. During overdrilling the auger follows the steel casing to the target depth. Centering must be assured through use of one of the above-described centering methods. The overdrilling shall progress slowly to insure that the drilling operation remains centered over the well/boring. Once the base of the well is reached the auger or drilling equipment shall be left in place, to prevent cave in of materials, while proceeding to Step 6.

   For unconsolidated wells installed using driven casing or equivalent methods (i.e., no annular materials), it may be possible to pull the outer casing or well *in lieu* of overdrilling. If this procedure is used, grouting must be completed concurrently with the pulling of casing with grout level maintained within 5 feet of ground surface while the casing is pulled. The grout shall be introduced into the well from the base using a tremie line through the innermost casing (with the base of the well removed). The grout mixtures and procedures shall be as described in Step 6.

   Driven casing wells completed entirely in competent bedrock may be decommissioned without removing the casing by tremie grouting according to the procedures described in Step 6.

7. Upon removal of the casing, well screen and annular materials, the resulting boring shall be tremie grouted. The grout shall be a high solids bentonite grout as defined above. Essentially, the grout mixture shall contain as high a bentonite content as can be reasonably pumped (30% bentonite by weight). For wells installed in competent bedrock state regulations often mandate use of a neat cement grout mixture. It is preferable in cases where the borehole intersects both competent bedrock and unconsolidated materials that the unconsolidated interval shall be abandoned using a high solids bentonite grout. Grout shall be mixed to a uniform consistency. The grout shall be pumped into the boring through a tremie pipe placed at the bottom of the boring. The auger flights shall be left in place until the tremie line is situated at the bottom of the boring. Grouting shall proceed in a continuous and expeditious manner by concurrently pulling the auger flights and pumping grout until the grout level is within two feet of the ground surface. Both the bottom of the tremie pipe and the base of the auger flights must remain submerged in grout while the well is grouted.

   After the grout has settled for 24 hours, the borehole must be checked for grout settlement, and if necessary, topped off with the appropriate grout mixture. The final level of the grout shall be within two feet of the ground surface. The top two feet of the borehole shall be abandoned by adding and compacting native soils.

8. Equipment used for well decommissioning shall be cleaned and decontaminated between decommissioning locations.

9. Upon completion of decommissioning activities, well decommissioning materials and equipment will be removed from the site and the site will be restored. Over-drilled well materials and cuttings shall be properly disposed.

10. After the well has been decommissioned, a record must be prepared. The record must contain the following information, at a minimum:
    - Name and address of property owner;
    - Name, license or registration number of the contractor doing the work, name of the driller performing the work, and the signature of the representative;
    - Date work was completed;
    - Survey information including the county, township, range, section, and three quartiles, and the street address or fire number of the well or boring (for unincorporated areas);
    - A description of the geological material penetrated by the well (i.e., copy of the original boring log);
    - The original well or boring depth, and current well or boring depth;
    - The approximate date of construction;
    - The grout or sealing materials, type, quantities, and intervals;
    - The casing type, diameter, and depth, if present;
    - The screen or open hole depth interval, if present;
    - A description of any obstruction, if present;
    - A description of any deviations from the above procedures, or other unusual conditions encountered or actions taken; and
    - A statement as to whether or not all well materials were removed and if not a detailed explanation of the type of materials left in place and their approximate elevation, type, condition, etc.
11. Copies of the decommissioning record are to be forwarded to the site and the State agency if required.

4.1 Failure to remove all well materials

If for any reason the above decommissioning procedures fail to remove all well casing and screen materials, the well shall be permanently marked with a steel post and attached name plate containing the well identification. The name plate and/or site records shall contain, at a minimum, the following:

- Well Identification;
- Date of installation;
- Date of decommissioning;
- Survey coordinates; and
- Approximate elevation interval of in place well materials.

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WELL INSPECTION REPORT

FACILITY INFORMATION

Owner: _____ **Permit No.** _____

Location: _____ **Project No.** _____

INSPECTION

Inspection Date: _____ **Inspector Name:** _____

Time: _____ **Weather Conditions:** _____

MONITORING WELL CONDITIONS

Well ID: _____

Lock Condition: _____

Protective Casing Condition: _____

Pad Condition: _____

Pump Type: _____

Pump Serial No.: _____

Pump Condition: _____

Tubing Condition: _____

Sediment Accumulation in Well (describe): _____

Depth to Water (feet): _____

Depth to Bottom (feet): _____

Comments: _____

_____

Signature: _____ **Date:** _____

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APPENDIX C

EXAMPLE CHAIN-OF-CUSTODY FORM, SAMPLE LABEL, AND CHAIN-OF-CUSTODY SEAL

ENVIRONMENTAL SAMPLING SUPPLY

LOT#

SAMPLE ID

SAMPLED BY	DATE
	TIME
LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

Oakland, CA • Houston, TX • Chicago, IL • Richmond, VA
(510) 562-4988 www.essvial.com (800) 233-8425

ENVIRONMENTAL SAMPLING SUPPLY

LOT#

SAMPLE ID

SAMPLED BY	DATE
	TIME
LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

Oakland, CA • Houston, TX • Chicago, IL • Richmond, VA
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LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

Oakland, CA • Houston, TX • Chicago, IL • Richmond, VA
(510) 562-4988 www.essvial.com (800) 233-8425

ENCO

CUSTODY SEAL

Date: ______________________________

Signature: ______________________________

ENCO

ENVIRONMENTAL CONSERVATION LABORATORIES, INC.
4810 Executive Park Ct., Ste 211 • Jacksonville, FL 32216-6069 • (904) 296-3007
10775 Central Port Drive • Orlando, FL 32824 • (407) 826-5314
102-A Woodwinds Industrial Court • Cary, NC 27511 • (919) 467-3090

ENVIRONMENTAL SAMPLING SUPPLY

LOT#

SAMPLE ID

SAMPLED BY	DATE
	TIME
LOCATION	PRESERVATIVE
ANALYSIS	CLIENT

Oakland, CA • Houston, TX • Chicago, IL • Richmond, VA
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ANALYSIS	CLIENT

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(510) 562-4988 www.essvial.com (800) 233-8425

ENCO

CUSTODY SEAL

Date: ______________________________

Signature: ______________________________

ENCO

ENVIRONMENTAL CONSERVATION LABORATORIES, INC.
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10775 Central Port Drive • Orlando, FL 32824 • (407) 826-5314
102-A Woodwinds Industrial Court • Cary, NC 27511 • (919) 467-3090

CHAIN OF CUSTODY

CLIENT NAME:	PROJECT NAME:
CLIENT CONTACT:	SITE NAME:
CLIENT ADDRESS:	PROJECT NUMBER:
CLIENT PHONE NUMBER:	P.O. NUMBER:
CLIENT FAX NUMBER:	REGULATORY AUTHORITY:

Is sample for compliance reporting? YES NO	Is sample from a chlorinated supply? YES NO	PWS#
SAMPLER NAME (PRINT):	SAMPLER SIGNATURE:	**Turn Around Time:** **Day(s)**

CLIENT SAMPLE I.D.	Date Sampled	Time Sampled	Number of Containers	Grab	Composite	Field Filtered	MATRIX: Groundwater	Wastewater	Drinking Water	Soil	Solids	Other	ANALYSIS							COMMENTS: PLEASE NOTE PRESERVATIVE(S)
1)																				
2)																				
3)																				
4)																				
5)																				
6)																				
7)																				
8)																				
9)																				
10)																				

RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME	**LAB USE ONLY** **COOLER TEMP ℃** _____
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME	
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME	